

**THE BOOK WAS
DRENCHED**

UNIVERSAL
LIBRARY

OU_172867

UNIVERSAL
LIBRARY

OSMANIA UNIVERSITY LIBRARY

Call No.

Accession No.

Author

Title

This book should be returned on or before the date last marked below.

PUBLISHED

BY

**THE OSMANIA UNIVERSITY COLLEGE RESEARCH BOARD
HYDERABAD-DECCAN**

1934

ISSUED
ON BEHALF OF THE COLLEGE RESEARCH BOARD

BY

MOHAMED ABDUR RAHMAN KHAN
MOULVI ABDUL HAQ
SYED ABDUL LATIF

VOLUME II

PUBLISHED
BY
THE OSMANIA UNIVERSITY COLLEGE RESEARCH BOARD
HYDERABAD-DECCAN
1934

CONTENTS

	PAGE
Foreword by the Principal	v
List of Members of the Board of Research	vii
Further Investigations Concerning the Disintegration of Igneous Rocks by the Action of the Roots of Plants	1
<i>By Mohd. Abdur Rahman Khan, A.R.C.S., B.Sc. (London), F.R.A.S., Principal.</i>	
Immediate Ancestry of Nizam-ul-Mulk Asaf Jah I	3
<i>By Yusuf Husain Khan, D.Litt. (Paris).</i>	
The Meteorite Falls of 1928 near Purna	22
<i>By Mohd. Abdur Rahman Khan, A.R.C.S., B.Sc. (London), F.R.A.S., Principal.</i>	
"On a Fourth Order Partial Differential Equation	24
<i>By Raziuddin Siddiqui, M.A. (Cantab), Ph.D. (Leipzig), Assistant Professor of Mathematics.</i>	
The Pragmatist Elements in the Philosophy of Bergson	31
<i>By Mir Valiuddin, M.A. (Alig.), Ph.D. (London), Assistant Professor of Philosophy.</i>	
Percarbonates	39
<i>By Rangnath Rao Kamtiyar, and Syed Husain, M.A. (Alig.), Ph.D. (London), Professor of Chemistry.</i>	
A Nitrogen Derivative of the Cyclopentane Series. Synthesis and Constitution of Ethyl-5-Cyclopentane-Spirodicyclopentane-1: 2-Di- carboxyimide-3-Ketimino-4-Carboxylate	41
<i>By Kazi Moinuddin.</i>	
'Ibn-i-Sina	47
<i>By Mu'Tazid Wali-'ur-Rahman, M.A., Assistant Professor of Philo- sophy.</i>	
On the Equalisation of the Interval of Liquid Drops falling through Two Capillary Tubes	56
<i>By S. M. A. Khan and K. S. Iyengar.</i>	

- A note on the Ancient Mariner 59
 By *E. E. Speight*, B.A. (London), *Professor of English*.
- "The Reduction of Carbonic Acid by means of Nascent Hydrogen" . . 67
 By *M. Qureshi*, M.A., (Punjab), Ph.D. (Berlin), *Professor of Chemistry*, and *N. H. Effendi*.
- The Veda and the Geeta 74
 By *G. Dhareshver*, B.A. (Madras), *Assistant Professor of Sanskrit*.

FOREWORD

While issuing the Second Volume of the Journal of the Osmania University College, I may, on behalf of the Board of Research, express our sense of gratification at the very hearty and generous reception given to the First Volume by scholars both in India and abroad. We trust that this Volume also will be received with equal appreciation.

The members of the Board have during the last three years endeavoured to serve the cause of research in the different branches of learning with the material that has been at their disposal, so far, within the walls of the Osmania University. As years will advance, and further resources will accumulate, it is hoped that the Journal will be a means of dissemination of knowledge worthy of the aims with which the University was founded.

In bringing the Journal to this standard, my colleagues Moulvi Abdul Haq, Professor of Urdu, and Dr. Syed Abdul Latif, Professor of English, have given me invaluable help as its joint issuers. Dr. Latif has been the Honorary Secretary of the Board from the time of its formation. He has applied to the regular work of the Board, consisting of the selection of candidates for research scholarships and the control of their work, his pleasing vigilance, and to the conduct of the Journal his own love of research and his sense of discrimination. I take this opportunity to place on record the willing co-operation I have had from these two colleagues.

MOHD. ABDUR RAHMAN KHAN.

**THE BOARD OF RESEARCH,
OSMANIA UNIVERSITY COLLEGE.**

Chairman

Principal Mohammed Abdur Rahman Khan, B.A. (Madras), A.R.C.S.,
B.Sc. (London), F.R.A.S.

Hon. Secretary

Prof. Syed Abdul Latif, B.A. (Madras), Ph.D. (London)

OTHER MEMBERS

Prof. Qazi Mohammed Husain, M.A., LL.B. (Cantab.)

.. Mirza Husain Ali Khan, B.A. (Oxon.), *Bar.-at-Law*

.. Abdul Haq, B.A., (Aligarh)

.. Haroon Khan Sherwani, M.A. (Oxon.), *Bar.-at-Law*

.. Rai Kishen Chand, M.A. (Cantab.)

.. Muzaffer-uddin Quraishi, M.A. (Punjab), Ph.D. (Berlin)

.. Mohammed Abdul Qadir Siddiqi, Moulvi Fazil

.. Husain Ali Mirza, *Bar.-at-Law*

.. Mohammed Nizam-uddin, Ph.D. (Cantab.)

.. Abdul Haq, B.Litt., D.Phil. (Oxon.)

.. Wahidur Rahman, B.Sc. (Calcutta)

.. Khalifa Abdul Hakeem, M.A. (Punjab), Ph.D. (Heidelberg)

.. Syed Husain, M.A. (Alig.), Ph.D. (London)

.. Mir Siadat Ali Khan, M.A., LL.B. (Osmania), B.C.L., Ph.D. (Oxon.)

.. R. Subba Rao

.. T. R. Rama Rao, B.A. (Madras)

.. Syed Jaffer Husain, Ph.D. (Heidelberg)

.. C. N. Joshi, M.A. (Bombay)

.. Mir Vali-uddin, M.A. (Alig.), Ph.D. (London), *Bar.-at-Law*

.. Syed Mohammed Ali Khan, B.A. (Osmania), A.R.C.S., B.Sc. (London)

.. Mohammed Razi-uddin Siddiqi, M.A. (Cantab.), Ph.D. (Leipzig)

.. Qari Syed Kalimullah Husaini, M.A., LL.B. (Osmania), Ph.D.
(London)

- Prof. Zahir-uddin Ahmed, Doctor's Diploma (Cairo)
- „ Syed Gulam Mohi-uddin, M.A. (Osmania), Ph.D. (London)
 - „ Ibne Hasan, M.A. (Allahabad), Ph.D. (London)
 - „ Mohammed Said-uddin B.Sc. (Bombay), M.A. (Edin.)
 - „ B. K. Das, D.Sc. (London)

FURTHER INVESTIGATIONS CONCERNING THE DISINTEGRATION OF IGNEOUS ROCKS BY THE ACTION OF THE ROOTS OF PLANTS

BY

MOHD. ABDUR RAHMAN KHAN

(*With two plates*)

I

IN the paper on disintegration of igneous rocks published in Vol. I of this Journal last year it was stated that further investigation was being carried on with reference to the chemical composition of rocks in various stages of disintegration, along with their microscopic examination, etc. The following is a summary of some of the results thus obtained.

CHEMICAL ANALYSIS

(By DR. SYED HUSAIN)

Ingredients	Undecomposed rock		Much decomposed rock (easily breakable)	
	Sample (1)	Sample (2)	Sample (1)	Sample (2)
SiO ₂ ...	74.29	74.33	77.02	77.05
Fe ₂ O ₃ + Al ₂ O ₃ ...	16.39	16.38	15.96	15.96
CaO ...	2.62	2.60	2.06	2.05
MgO ...	4.98	4.99	4.34	4.35
Alkalies as K ₂ O ...	1.62	1.59	0.55	0.57
	99.90	99.89	99.93	99.98

Assuming the decomposed rock to have been originally of the same composition as the undecomposed rock the above figures show that there has been a loss of about.—

21.26 per cent of CaO,

12.83 " " " MgO, and

65.11 " " " Alkalies (as K₂O).

This is on the whole what one would expect under the circumstances.

MICROSCOPIC EXAMINATION AND DENSITY, ETC.

(By MOHD. A. R. KHAN)

Specimen (1). Undecomposed trap rock: Sp. gr. 2.6657 (allowing for the usual corrections of buoyancy and temperature); colour, on the whole, reddish black; powder examined under the microscope showed presence of (white) quartz, (black) hornblende and (pink) felspar.

Specimen (2). Undecomposed trap rock: Sp. gr. 2·6391; colour dark on the whole; quartz and hornblende particles in plenty.

Specimen (3). Somewhat disintegrated rock: Sp. gr. 2·6110; some black undecomposed hornblende and some brown or yellow partially decomposed hornblende with white quartz.

Specimen (4). Much disintegrated rock: Sp. gr. 2·5859; few black particles of undecomposed hornblende, but mostly white quartz and some grey disintegrated hornblende.

It was from such microscopic examination and specific gravity determinations that the action of roots was first surmised (vide *Current Science* vol. I, No. 3, Sept. 1932).

To see how far *Carissa carandus* or the other plants mentioned in Vol. I of this Journal could thrive on the ingredients of the Hyderabad trap rock, on November 3rd 1933, some fresh seedlings of *Carissa carandus* were planted in a pot containing pure pulverized trap rock. They were watered with ordinary tap water. Plate I, figure (1) shows their condition as photographed on 31st May 1934. There can be no doubt whatsoever that the growth has been quite healthy and vigorous.

Figure (2) shows the condition of three somewhat smaller seedlings of the same plant, planted in a pot containing ordinary garden soil on 16th November 1933. The same tap water was used for them also and the two pots were kept always side by side under the same conditions of shade and sunshine. Although it may not be justifiable perhaps to remark from these data that the plant can thrive better on pure pulverized trap rock than in ordinary soil, it would be certainly correct to conclude that the plant will fare no worse.

We bring this paper to a close after illustrating some remarkable cases of the action of roots on igneous rocks. Plate I, figure (3) shows a big granite boulder rent asunder by a sharifa plant (*Anona squamosa*) and altered noticeably in texture and composition. The left portion of the rock seems to have been subject to the action of the roots of plants, now defunct, for a considerable number of years, and is more or less completely altered. The right portion is only partially altered; and one feels almost tempted to state that in due course, when the plant will have used up all the available mineral food from it the rock itself will be reduced completely to sandstone like its left portion. A number of such rocks with their 'tell-tale' looks may be seen occasionally among the hills of Hyderabad.

Plate II, figure (1) depicts the barren and wild-looking rocks close to the 8-mile stone on the way from the Char Minar to Himayat Sauger, leading towards the southern extremity of the lake bund. The plants whose roots were responsible for 'rounding off' the corners of these rocks and for shaping them into their present weird forms, appear to have been washed away by the floods of bygone ages; and one may venture to state that the present configuration would endure for several centuries, unless some of our modern troglodytes take a fancy to the spot and carve out their fashionable abodes among its boulders!

Plate II, figure (2) shows the hill scenery on the opposite side of the road. It is possible that, owing to the same agencies at work, these hills also, if left to themselves, may, in course of time, become as barren and wild as the rocks of figure (1). It would be interesting if, at a centenary meeting of the Osmania University, a future investigator were to refer to the present discourse and examine as to how far the scenery of figure (2) would tend to approach that of figure (1) in general character.

I take this opportunity of thanking Dr. Syed Husain of the Chemistry department for his chemical analysis of the rock specimens above referred to.

PLATE I

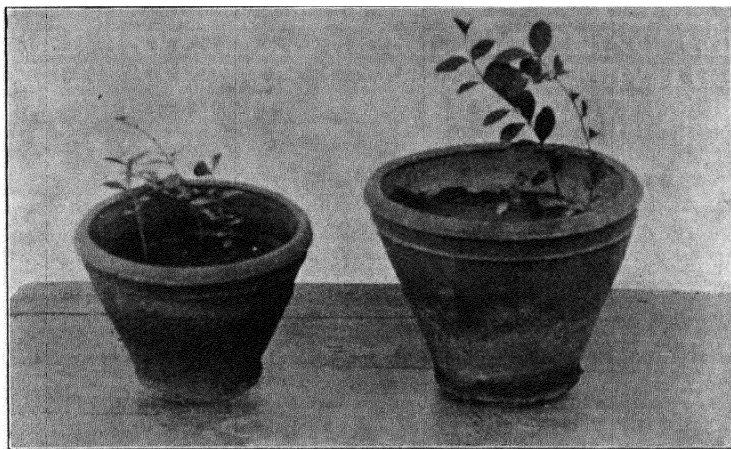


Fig. 2

Fig. 1

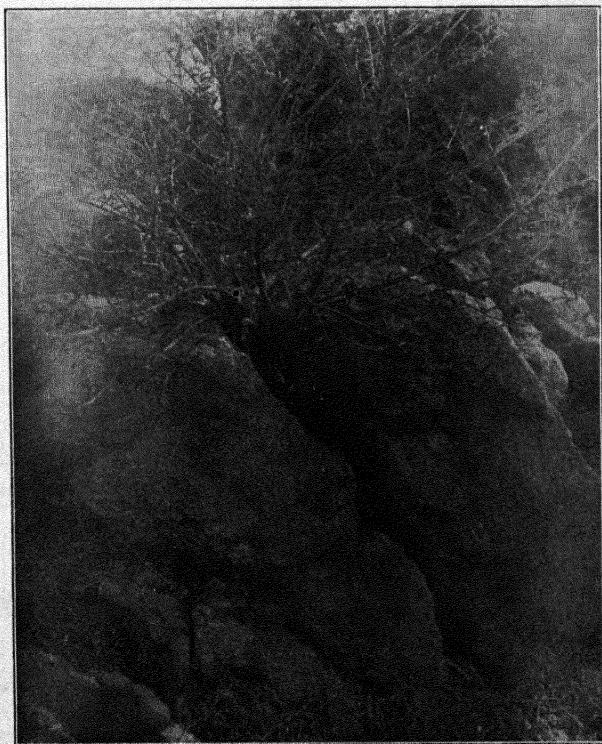


Fig. 3

PLATE II



Fig. 1

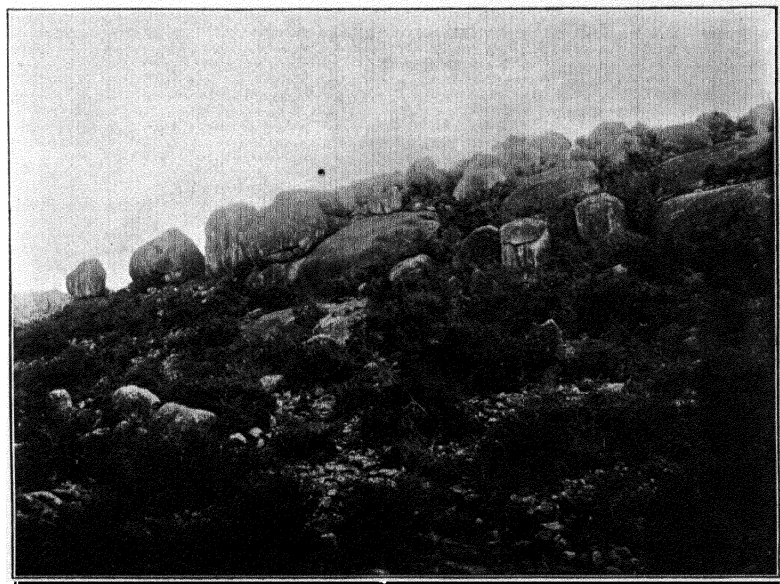


Fig. 2

IMMEDIATE ANCESTRY OF NIZAM-UL-MULK ASAF JAH I.

BY

YUSUF HUSAIN KHAN

KHWĀJA 'Ābid, grandfather of Nizām-ul-Mulk, was born in 'Ālī Ābād, in the neighbourhood of Samarqand, in the kingdom of Bokhārā. Moving from his native place, he established himself at Bokhārā, where his talent had greater opportunity of recognition. He was the son of 'Ālam Sheikh, a celebrated man of letters and a well-known Sūfi of his time. The King of Bokhārā had bestowed on the latter the title of 'Āzam-ul-Ulamā, which testifies to his being one of the most learned men of the realm. Khwāja 'Ābid's mother was from the family of Mir Hamdān, a distinguished Syed of Samarqand. 'Ālam Sheikh originally came from Suhraward, a small town in Kurdistān, and traced his descent to Sheikh Shihābuddīn Suhrawardī, a great spiritual teacher and author of eminent works on Tasawwuf, who in his turn called himself a descendant of Abū Bakr, the First Caliph.¹

'Ālam Sheikh was reputed to be endowed with spiritual powers. He had numerous disciples all over the kingdom of Bokhārā to whom he used to prescribe rules of discipline and devotion. He gave religious education to his son Khwāja 'Ābid, who after the death of his father moved to Bokhārā. His intelligence and ability soon attracted the attention of men in authority there, and he was offered the post of chief Qāzī, which he accepted. A little later he was made Sheikh-ul-Islām, a very important office in the realm.

Khwāja 'Ābid came to India in 1065 H. (1654-55 A.D.), on his way to Mecca in the twenty-ninth year of the reign of Shāhjahān. He presented himself at the Imperial court where he was received with distinction, invested with a robe of honour and given a purse of six thousand rupees. He was also offered a post in the Imperial service, which he promised to accept after his return from Mecca.

Khwāja 'Ābid came back from the Hajj in 1067 H. (1657 A.D.). He went straight to Aurangzib in the Deccan, hearing of the dangerous illness of Shāhjahān and the preparations for war made by his sons to contest the throne. Shujā' and Murād had already assumed royal titles, but Aurangzib conducted himself in a more cautious, diplomatic manner. He immediately moved to his northern frontier, leaving the territory of Bijāpur to be conquered later on, pretending to act in accordance with orders received from the Emperor. This abrupt withdrawal had dispirited his Mughal (Tūrānī) troops who considered themselves to have been deprived of the fruits of their long and arduous exertions. Several Mughal officers, dissatisfied with their lot, deserted him.

At this moment Khwāja 'Ābid desired to join his service. Aurangzib, considering him an asset, gave him high command over his own men, the Tūrānī soldiery, a very important element in the Imperial army. Khwāja 'Ābid, besides being a learned man, was well-versed in the arts of war. His adhesion to Aurangzib's

¹ The names in the pedigree are :—

1. Sheikh Shihābuddīn.
2. Abū Muhammad Hifz.
3. Sheikh Qutb-ul-Aqtāb Zainuddīn.
4. Sheikh 'Ala'uddīn.
5. Sheikh Tajuddīn.
6. Sheikh Fatehullah.
7. Sheikh Najfbullah.
8. Sheikh Jawid *alias* Sarmast.

9. Sheikh Fatehullah II.
10. Sheikh Jawid II.
11. Muhammad Darwesh.
12. Sheikh Muhammad Momin.
13. Mir Muhammad 'Ālam Siddiqi.
14. 'Azizān-i-'Ālam.
15. Khwāja Mir Ismā'īl *alias* 'Ālam Sheikh.
16. Khwāja 'Ābid.

cause proved extremely useful, in that he succeeded in rallying his countrymen round the standard of Aurangzib, during the fateful months that followed.

Aurangzib reached Burhānpur on 19th February, 1658 and remained there for a month, biding his time. Meanwhile, Dārā Shikūh had acquired virtual supremacy in the State, had taken pledges from Ministers to support his claims for the throne and had closed the roads leading to Bengal, Ahmedābād and the Deccan against messengers and travellers. (*Khāfi Khān*, vol. II, p. 4). Aurangzib succeeded in winning over Murād to his side, who promised him definitely to join him at Ujjain before attacking the common foe. During his stay in Burhānpur, Aurangzib granted to Khwāja 'Abid the rank of 3,000 zat, 500 horse, and the title of Khān. (*Ma'āthir-ul-Umarā*, vol. III, p. 121). On the way towards Ujjain he honoured him with a robe of honour, a steed and a jewelled dagger with pearl-inlaid strap. (*Ālamgīr Nāma*, p. 45.)

On receiving intelligence of the designs of Aurangzib and Murād, Dārā Shikūh directed Rāja Jaswant Singh of Mārwar and Qāsim Khān to march to Mālwa, in order to check their movements. Murād had joined Aurangzib at Ujjain. Their combined armies attacked Rāja Jaswant Singh who drew up his army on the river Sīpra, in the neighbourhood of Ujjain. After a bloody battle the Rājputs, under command of the Rāja, were defeated and dispersed in different directions. The Rāja fled and retired to Jodhpur, his capital.

After the successful termination of the battle Khwāja 'Ābid (Khān) was promoted to the rank of four thousand personal, and seven hundred horse, in recognition of his services and the prominent part he played in the campaign. (*Ālamgīr-Nāma*, p. 76; *Ma'āthir-ul-Umarā*, vol. III, p. 121). Aurangzib showed his confidence by asking him, along with Hazbar Khān and Zū'l-Qadar Khān, to remain beside him during his march towards the capital. (*Ālamgīr-Nāma*, p. 63.)

Khwāja 'Abid was with Aurangzib when the battle of Samugarh was fought in June, 1658 A.D. which resulted in the defeat of Dārā Shikūh and the annihilation of his cause. He must have been one of those on whom Aurangzib bestowed presents 'favouring them with his commendation and eulogy'. (*Khāfi Khān*, vol. II, p. 29). The men who had gained great influence on Aurangzib, by proving their worth during the battle, were Khwāja 'Ābid, Mukhlis Khān and Munim Khān. They were consulted about every proceeding concerning the impending operations that Aurangzib undertook to clear the way of his rivals and achieve his aim.

Khwāja 'Ābid served Aurangzib with distinction, during the first four years of his reign, mainly spent in consolidating and restoring quiet in his newly acquired possessions. He took part in the expeditions sent against Dārā, Shujā' and Rāja Jaswant Singh and established his reputation as a soldier (*Ālamgīr-Nāma*, pp. 248, 307). In the fourth year Khwāja 'Ābid was entrusted with the office of Faujdar of Behrat, in the neighbourhood of Alwar, inhabited by turbulent tribes of Meos, whose depredations extended at times to the walls of Delhi. He discharged the duties of this office for nearly a year when he was given the post of Sadr-i-kul (head of religious endowments) in place of Sheikh Mirak¹ who retired on account of old age. This was an important office as the Sadr-i-kul was considered to be one of the members of the King's ministry through whom passed all the work concerning the charitable grants of lands conferred

¹ Miran Syed Jalāl Bokhārī, better known as Sheikh Mirak, came to India from Khorāsān, during the reign of Jehāngīr. He joined at Lahore, the circle of disciples of Mullā 'Abdūl Salām, who was a distinguished man of learning and imparted lessons on *Fiqh* and *Hadīth* for nearly fifty years. Sheikh Mirak was engaged by Shāhjahān as teacher of the princes. In the 28th year of Shāhjahān's reign he was raised to the rank of 500 zat, 50 horse. When Aurangzib ascended the throne, he raised him to the rank of 3,000 and in the second year of his reign appointed him to the post of Sadr-i-kul, in place of Syed Hidāyatulla Qādiri. Being too old, he could not properly discharge the duties of his office. He retired in 1662 A.D. (1071 H), after two years of official life and died the same year. (*Ma'āthir-ul-Umarā*, vol. III, p. 519).

by the State. In 1665 A.D. (1075 H.) Khwāja 'Âbid was raised to the rank of 4,000, and 1,500 horse and an elephant was given to him. (*Âlamgîr-Nâma*, p. 855). He held the office of Sadr-i-kul for nearly six years.

In 1668 A.D. (1078 H.) he was replaced in this office by Rizwî Khân, son of Sheikh Mirak, and was sent to Ajmer as governor of the province. (*Ma'âthir-i-Âlamgîrî*, p. 62.) He remained there for nearly three years, and was transferred thence to the governorship of Multân where he discharged the duties of his office for four years. (*Ibid*, p. 110.) During all this time he enjoyed the full confidence of Aurangzib, as is shown by the fact that in the thirteenth year of his reign (1671), Aurangzib distributed especial robes of honour to those in whom he reposed the greatest trust; and Khwāja 'Âbid was one of the recipients, the others being Asad Khân (later known as Jumdat-ul-Mulk, chief Minister of Aurangzib), Murtuzâ Khân, Hasan 'Âli Khân and Tâhir Khân. Early in 1676, Khwāja 'Âbid was summoned by the Emperor to repair to the capital where he was entrusted with the leadership of the Hajj party going to Mecca. (*Ibid*, p. 143.) The leader of the Hajj party was every year appointed by the Emperor. He used to take the royal presents to Mecca and Medina. At the time of his departure, he received a especial robe of honour from the Emperor, a sign of great distinction. Generally the persons appointed for this mission were those who enjoyed a high reputation for their learning and piety. (*Ma'âthir-i-Âlamgîrî*, p. 143.)

After his return from Mecca, Khwāja 'Âbid repaired to the court and joined the Emperor. He must have remained at the court till August 1679, when the Emperor marched to Râjputâna to restore order and establish his authority in that part of the country.

The death of Râja Jaswant Singh at Jamrud, who had been reinstated in his rank at the intercession of Mirza Râja Jai Singh and had been appointed to the command of frontier outposts, occasioned a rising in Râjputana which ended in a long-drawn-out war. Râja Jaswant Singh had left no son, therefore, the Emperor decided to annex the Mârwar State. He refused to recognise Ajit Singh, his posthumous son, born at Lahore. But Ajit Singh's cause was espoused by Durgadâs, son of Râja Jaswant's minister Askaran, a Râthor veteran of great courage and faith. The serious nature of the Râjput rebellion could well be realised from the fact that the Emperor called up reinforcements from all parts of the Empire and made Ajmer his headquarters. He summoned prince Â'zam from Bengal, prince Mu'azzan from the Deccan and dispatched his own army under the command of prince Akbar to invade the Râjput territory from all sides. The Rânâ of Udaipur, who had actively joined the Râthor rebels, on hearing of the Imperial advance fled into the mountain fastnesses, with treasure, family and followers. (*Khâfî Khân*, vol. II, p. 263.) Jodhpur was reoccupied and all considerable towns in the plains were captured and Mughal civil and military posts were established.

When the Rânâ and the followers of Durgadâs felt hard pressed they thought of creating disunity in the ranks of the Emperor, by pretending to offer their allegiance to prince Mu'azzam provided he joined them. But the prince, made of harder stuff paid no heed to these tempting messages. When disappointed, they tried the same game with prince Muhammad Akbar. Durgadâs, considered to be a very persuasive spokesman, called on the prince, pledging on behalf of his followers as well as the Rânâ of Udaipur to accept his suzerainty. He succeeded in leading the inexperienced prince astray, who ascended the throne, struck coins in his own name and advanced on Ajmer to fight a decisive battle with his father. Tahawwar Khan was given the rank of seven thousand and the title of Amîr-ul-Umarâ. Mujâhid Khan, son of Khwāja 'Âbid, also received distinguished honours which he feigned to have accepted, desiring all the time to go over to the Imperial side at a suitable opportunity. (*Khâfî Khân*, vol. II, p. 366.)

Early in 1680, Khwāja 'Âbid was appointed to pursue prince Muhammad Akbar, along with the prince Shâh 'Âlam (later known as Bahâdur Shâh). As he had already

lived in Ajmer for some time as governor of the province, he was considered to be in the best position to know the men and affairs of that part of the country. Several Rājput chiefs, Inder Singh, Rām Singh and Subhān Singh also accompanied the party. Fifty thousand gold coins were given to Shāh 'Ālam personally and fifty thousand were given to the party for the expenses of the expedition. (*Ma'āthir-i-'Ālamgiri*, p. 203.) In recognition of his services he was awarded a robe of honour and a horse with golden trappings, and the title of Qalich Khān.

It seems that Qalich Khān did not see eye to eye with the prince Shāh 'Ālam on certain religious matters, the prince being inclined towards Shāfite sect while the former was a man of orthodox views. As his views ran counter to those held by the prince, he left him without even asking his permission, and joined the Imperial party. When Aurangzib came to know of this affair, he ordered Ihtimām Khān, Kotwāl, to put Qalich Khān in internment. Later he was put in charge of Salābat Khān and in view of his ability, however, he was pardoned and released after a few months. This was a disciplinary measure. Aurangzib did not even spare his sons if they did anything against his will.

Having regained the confidence of the Emperor, Qalich Khān was re-appointed to the post of Sadr-i-kul in 1681, after the death of Rizvi Khān. Next year he was directed to accompany prince A'zam in his campaigns in the Deccan where prince Muhammad Akbar had taken refuge at the court of Sambhāji, son of Sivaji. In his place Sharif Khān was appointed as Sadr-i-kul by royal orders. (*Ma'āthir-i-'Ālamgiri*, p. 219.) When taking leave from the Emperor, Qalich Khān was given a robe of honour, a horse and the right of playing kettle-drums. This latter right was a special favour granted only to the nobility of the rank of 2,000 upwards. It was not to be exercised in the presence of the Emperor, nor within a prescribed distance from the place where he happened to be residing. (*Ma'āthir-i-'Ālamgiri*, p. 214.)

In the 29th year of Aurangzib's reign Qalich Khān was appointed to the governorship of Zafarābād (Bīdar), and was again given a robe of honour, a suit of armour and an elephant. Najābat Khān and Asālat Khān, sons of Syed Muzaffar Hyderābādī,¹ and Ikrām Khān, Nāsir Khān and Syed Hasan Khān were appointed to work under his orders. (*Ma'āthir-i-'Ālamgiri*, p. 263.)

When the Emperor resolved to march in person to effect the conquest of Bijāpur, Qalich Khān joined him at Sholāpur and accompanied him throughout the campaign in 1685-86. He was in command of the entrenchments and received a bow and a quiver from the Emperor. After the conquest of Bijāpur he obtained a horse and a dagger as a royal present.

In 1687, Qalich Khān took a conspicuous part in the siege of Golconda. Being the leader of the storming party, he was leading a charge when heavy cannonade from the enemy overtook him. His right shoulder was struck by a musket-ball, inflicting a deadly wound. Lutfullah Khān came to his rescue and took him to the camp. He refused to dismount, riding back all the way to the camp, in spite of the shattered condition of his right arm. Aurangzib was much grieved to hear of this mishap. He sent down his surgeons to treat him. Next day Asad Khan (Jumdat-ul-Mulk), the chief Minister, came to inquire after his health, on behalf of the Emperor. On reaching Qalich Khān's camp, he was surprised to see him sitting with perfect composure, taking coffee with the left hand while the surgeons were busy taking out bits of iron and bone from his wound in the right shoulder. With the usual smile on his face, he told the chief

¹ Najābat Khān and Asālat Khān joined Sheikh Nizām Hyderābādī, deserting the cause of the Emperor, prior to the first siege of Golconda. Qalich Khān, reposing full trust in them sent them to serve as guides for the forces of prince Shāh 'Ālam and Khān Jehān. The roving parties of Qutbu'l-Mulk's generals under the command of Sheikh Nizām harassed the Imperial forces, creating greater confusion by winning over the two brothers (Najābat Khān and Asālat Khān). (*Ma'āthir-i-'Ālamgiri*, p. 269.)

Minister that he soon hoped to be fit and to be able to resume his duties in the service of the Emperor. According to his wont he was all the time amusing the surgeons by admiring the beauty and charm of their looks. (*Ma'âthir-i-'Âlamgîrî*, p. 289.) No treatment prevailed against the hand of death. Qalich Khân died after three days and was buried at *Asafnagar* in the neighbourhood of the Golconda fort. His right arm which was carried away by a canon ball is said to have been buried in the village of Qismatpur. It was recognised by his signet-ring and buried where it was found. The anniversary of Qalich Khân is still observed by the Sarf-i-Khâss.

Qalich Khân was held in high esteem by Aurangzib. During his three days' illness, the Emperor wrote to his son, Ghâziuddîn Khân Fîrûz Jang, saying:

'I wanted to come down to inquire after the health of that devoted well-wisher of the State. But I said to myself that I might not be able to bear the sight of his painful condition. This is why I sent down Jumdat-ul-Mulk to see him with my eyes and to tell him the secret of my heart. The only fruit now obtainable is grapes but the Ūnânî physicians think they will not agree with the condition of that pillar of the State, than whom there is no one who knows the royal disposition better. I have resolved not to eat the grapes myself. God willing, we both will eat together, after he is restored completely. A distich:

O God! my desire is so lovely,

Would that I might fulfil it!'

(*Ruqât-i-'Âlamgîrî*.)

Once writing to prince Āzam, Aurangzib puts forward the name of Qalich Khân as an example to be followed by other leaders. He says:

'I have received information to the effect that Qalich Khân is extremely considerate towards his soldiery. He offers them coffee, has breakfast served them at the time of breakfast and meals at the time of meals. When the soldiers leave his place, he offers them scent and betel-leaf. He sends all kinds of food to the houses of the soldiers so that their women-folk and children may not complain and be sad on account of their men eating everything by themselves, and on account of our niggardliness to grudge to let them partake of our meals.' Further on, Aurangzib relates an anecdote of some holy man to whom somebody complained of the bad times. The holy man replied that one should be grateful that worse had not yet come. Aurangzib purported to convey that his age was not so bad as people said since it had men like Qalich Khân living in it. (*Ibid.*, p. 20.)

Qalich Khân left five sons. The eldest, Shihâbuddîn Khân, later known as Ghâziuddîn Khân Fîrûz Jang, earned the position of highest distinction possible for any Mughal noble. The latter had two real brothers, Mujâhid Khân¹ and Muhâmid Khân²; the others being, Hâmid Khân³ and Abdur Rahim⁴.

¹ His name was Muhammad 'Arif. For some time he was appointed Faujdâr of Khairâbâd. In the 18th year of Aurangzib's reign 'Inâyat Khân succeeded him (*Ma'âthir-i-'Âlamgîrî*, p. 141). In the 24th regnal year he received a robe of honour and an increment of his Mansab (*Ibid.*, p. 199), in recognition of his services in Râjputâna by leaving prince Muhammad Akbar and joining the Imperial party.

² He does not seem to have acquired any distinction in his career. He led a mediocre existence.

³ He was a half-brother of Ghâziuddîn Khân Fîrûz Jang. In the 29th year of Aurangzib's reign he was complimented by obtaining a title and a she-elephant as Imperial gifts. (*Ma'âthir-i-'Âlamgîrî*, p. 263.) He was put in charge of the treasure sent to Mâlwa for the expenses of prince Āzam's army. (*Ibid.*, p. 263.) In the 48th regnal year he was raised to 1,500 Zât, and 500 horse. Next year he quarrelled with his half-brother Fîrûz Jang and came to the Imperial presence and was promoted to 2,000 Zât, 1,000 horse. (*Ibid.*, p. 495.) In the reign of Farrukhsiyar he was raised to the rank of 5000 and was considered to be a distinguished person in the court. He was especially appointed by this Emperor to quell the rebellion of the Jâts living between Agra and Delhi. Later the title Mu'izzud-Daulah Salâbat Jang was bestowed on him, during the reign of Muhammad Shân. Nizâm-ul-Mulk appointed him his deputy in Gujerât but recalled him and made him Subedâr of Nânded in the Deccan. He died in Gulbarga on his way to the Carnatic and was buried near the tomb of Syed Muhammad Gisûdârâz. Nizâm-ul-Mulk was one of those who carried the coffin all the way to the grave, on their shoulders. (*Târîkh-i-Fatâh*, MS).

⁴ Later he was known as Nasir-ud-Daulah Salâbat Jang. He obtained the title of Khân in Aurangzib's reign. Bahâdur Shân conferred on him the title of Chin Qalich Khân and appointed him faujdâr of Jaunpur. When Nizâm-ul-Mulk retired from the world, he also accompanied him. He took active part in the battles against Dilâwar 'Alî Khân

Shihâbuddîn was born in Samarqand about the year 1649 A.D. After his father left for India, he entered into the employ of Subhân Qulî Khân, ruler of Bokhârâ. He desired to join his father in India, but the ruler of Bokhârâ grew so fond of him that he would not let him depart. One day Subhân Qulî had gone out for recreation and Shihâbuddîn and two courtiers, Khwâja Yâqûb and Rustam Bey also accompanied him. Shihâbuddîn succeeded in getting round the two courtiers to persuade the king to give him permission to proceed to India and join his father. It is difficult to find out whether they agreed to do this, because they wanted to please him, or whether feeling jealous at the increasing influence the young man was acquiring with their patron, they desired to clear the way for their own ambition. Anyhow they mentioned the whole matter to Subhân Qulî Khân at a favourable opportunity when his disposition was in a most agreeable state. For 'those who desire to get something done by their lords, have to wait for a suitable occasion'. They, however, succeeded in getting permission for their young friend to go to India. Then the king summoned the young Shihâbuddîn and recited the first sûra of the holy Qurân, which is done when some dear one departs, and addressed him thus: 'Thou goest to India, thou shalt become great'. In truth his words came true. Shihâbuddîn acquired such rank and distinction in India as could well be the object of envy for the lords of Balakh and Bokhârâ. (*Ma'âthir-i-'Âlamgîrî*, p. 91; *Ma'âthir-ul-Umarâ*, vol. II, p. 872.)

Shihâbuddîn arrived in India in the 12th year of Aurangzib's reign (1669), when he was hardly twenty years of age. He was well received by the Emperor who conferred the rank of 300 Zât, 70 horse on the promising young man. The Emperor evinced further interest in the young man by getting him married to Safia Khânam, daughter of Sadullah Khân, the chief Minister of the Emperor Shâh Jehân. (*Târikh-i-Fathiah*.)¹

For nearly ten years he worked as an apprentice, probably with his father. When the Emperor summoned his highly-trusted officials and noblemen from different parts of the country to Râjputâna, Shihâbuddîn also joined him at his headquarters at Ajmer. His courage and skill as a soldier were first noticed when he took part in the expedition led by Hâmid Khân (son of Murtuzâ Khân) to chase the Râthors in their mountain fastnesses. He was complimented for his services, by getting a robe of honour and a she-elephant, from the Emperor. (*Ma'âthir-i-'Âlamgîrî*, p. 194.)

After his return from this expedition, Shihâbuddîn was summoned at midnight by the Emperor who asked him to bring speedy information from Hasan 'Alî Khân, from whom no intelligence had arrived since a long time. All communications with him had been cut off and he was left isolated in the defiles north-west of Udaipur. This had caused great anxiety to the Emperor. Shihâbuddîn, not even knowing the topography of that part of the country, full of forests and wild beasts and infested with robbers, agreed to undertake the mission. At the risk of his life he started immediately and by forced marches brought back intelligence in two days' time. In recognition of this service, the Emperor bestowed on him the title of 'Khân' and is reported to have foreseen his greatness and said: 'One who, like the ruby, goes through afflictions patiently, becomes the decoration of the wreath of fortune's crown'. It was mainly due to the enterprising courage of Shihâbuddîn Khân that the Imperial forces under the command

and 'Âlam Alî Khân. He was raised to 5,000 Zât and 5,000 horse, and obtained the title of Nasir-ud-Daulah Salâbat Jang in 1132 H. Nizâm-ul-Mulk sent him as Governor of Burhânpur, superseding Marhamat Khân. After the victory over Mubâriz Khân, he was promoted to the rank of seven thousand. After the death of A'izz-ud-Daulah, he was appointed governor of Aurangâbâd. After the invasion of Nâdir Shân, when Nizâm-ul-Mulk obtained permission from the Emperor to go to the Deccan to quell the rebellion of his son, Nâsir Jang, Abdur Rahîm welcomed him at Burhânpur and got the title of Mubâriz Jang. He died in Aurangâbâd in 1156 H. He was a distinguished calligraphist and a great patron of arts. His nom-de-plume was 'Faizraqam'. His son Mujâhid Khân did not achieve any fame. (*Ma'âthir-ul-Umarâ*, vol. III, p. 837).

¹ According to the author of the *Târikh-i-Khusrâvâ Jâhî* the name of the daughter of the chief Minister was Wazîr-un-Nisâ. (p. 370.) I have not been able to ascertain his source of information.

of Hasan 'Alī Khān were saved from disaster. This general was reinforced and freshly provisioned, and after a few weeks he was in a position to inflict a severe defeat on the Mahārāna of Udaipur (22 January, 1680), crushing his power completely and compelling him to flee to the Aravalli hills.

Soon afterwards Shihābuddīn Khān was directed to proceed towards Sirohī, (*Ma'āthir-i-Ālamgiri*, p. 199) in order to check the movements of Durgadās who contemplated attacking Ajmer to contest the Imperial throne in favour of prince Muhammad Akbar. Shihābuddīn Khān succeeded in sowing seeds of disaffection in the army of the prince. The first thing he did was to send secret intelligence to his brother, Mujāhid Khān, about his movements. Mujāhid Khān although exalted to a high position by the prince, waited for an opportunity to escape and join the Imperial forces. He went to prince Muhammad Akbar and succeeded in persuading him to give him (Mujāhid Khān) leave to go and bring over his brother, Shihābuddīn Khān, to his side. After obtaining permission from the prince, he took as much money and valuables as he could carry with him and joined his brother with the intention of never returning. His desertion was followed by that of many others of all ranks and conditions, very few remaining with the prince. The prince had also sent Mirak Khān, in whom he had the greatest confidence, to go and persuade Shihābuddīn Khān to join him. (*Ma'āthir-i-Ālamgiri*, p. 199.)

When prince Akbar's armies approached Ajmer and made preparations for general action next day, most of his men went over to Shihābuddīn Khān's side during the night. Only a few men under the command of Ziauddīn Muhammad Shujāi and the Rāthor soldiery remained with him (*Khāfi Khān*, vol. II, p. 275). The prince feeling dispirited resolved to take to flight and seek an asylum with Sambhājī who received him well, gave him a house to dwell in near the fort of Rāhīrī and fixed an allowance for his maintenance (*Ibid*, p. 277).

Shihābuddīn Khān having achieved his purpose without any shedding of blood, repaired to Ajmer. The Emperor was highly pleased to welcome him. He was anxiously awaiting fresh reinforcements in view of the preparations made by prince Muhammad Akbar and his Rājput coadjutors, and had entrenchments dug around the camp and batteries fixed up on the hills around. The arrival of Shihābuddīn Khān reassured the Emperor who invested him with a robe of honour on account of his feat of covering the distance of 120 miles (60 Kiroh) from Sirohī to Ajmer and on his winning over the prince's soldiery to his side, and appointed him to the post of 'Dārogha-i-Arz-i-Mukarrar' which was reserved only for the nobles in whom the Emperor reposed the greatest confidence. The occupant of this post was charged with the duty of revising royal orders and placing them for the second time for Imperial sanction. Two hundred men of his party also received honours. Mirak Khān, who had left all his belongings in the camp of the prince was given a robe of honour, two thousand rupees in cash and the rank of 200 Zāt, 50 horse.

Aurangzib concluded a treaty with the Rānā of Udaipur in June, 1681, through the intermediary of Shīām Singh of Bikāner, in order to march towards the Deccan to break the dangerous alliance between prince Muhammad Akbar and Sambhājī, who intended to set up the former as a rival claimant to his father and also to rally the Rājputs under his banner. (Orme's *Fragments*, p. 108.) The Emperor, from the very beginning of his operations in Rājputana had tried to conciliate Mahārānā Jai Singh of Mewār. He sent him a message telling him that the measures he had been compelled to adopt against the Rāthors, were directed by sheer political necessity, no other alternative being left open to him. He had reassured him as to the future of his kingdom and asked him to help the Imperial forces to crush the spirit of revolt in Mārwar (*Ādāb-i-Ālamgiri*; Asafia Library, Pers. MSS.) But Durgadās succeeded in gaining the ear of the Mahārānā. He made him realise, somehow or other, that after the occupation of Mārwar territory, the autonomy of Udaipur would be threatened, which would be then exposed to

invasion through the Aravalli passes. After the flight of Muhammad Akbar, the Mahārānā best consulted his own interest by coming to terms with the Emperor, whom he could resist no longer. The Emperor also welcomed the opportunity, as he wanted to leave in person for the Deccan to direct the operations there. The Rānā promised to refrain from offering any support, moral or material, to the rebellious Rāthors. He sent his Vakils with tribute and a declaration of obedience to the Imperial authority. The Emperor agreed to withdraw his forces from the territory of Mewār and to give the Rānā the rank of five thousand. In return, the Rānā ceded the sub-divisions of Mandal, Pur and Bednor to the Emperor, in lieu of the payment of Jizi'ya (*Sarkar*, vol. III, p. 422).

After this the Emperor started from Ajmer for the Deccan and reached Burhānpur on 13th November, 1681, from thence he left for Aurangābād where he arrived on 22 March. He organised roving parties of his troops, in order to give battle to the Mahrattās in different parts of the country. Prince M'uazzam, now dignified with the title of Shāh 'Alam, was sent to conquer the Konkan territory, and prince Ā'zam was directed to proceed towards Khândesh and Buglāna. Shihābuddīn Khān, though quite a young man, had acquired such a standing with the Emperor that he was also given the command of a party of troops to proceed in the direction of Junner (North Konkan) and to subdue the Mahrattā chiefs of that region. During his absence on this expedition, the Emperor was pleased to confer on him the post of Superintendent of mace-bearers, in place of Mukarram Khān. Syed Ughlān Khān was made his deputy. (*Ma'āthir-ul-Umarā*, vol. II, p. 874). After his successful operations, the Emperor directed him to reduce the fort of Rāmsej which was situated on the summit of a hill. Here Shihābuddīn Khān met a severe resistance from the besieged. All his exertions failed to produce any impression on the place. The besieged resisted with great perseverance and skill. The Qiledār of the fortress was a man of considerable experience. Having no iron cannon, he had wooden ones made. He used leather for missiles and drove back the assailants with showers of stones and burning grass. In the words of Khāfi Khān, 'each wooden cannon equalled ten iron ones' (Vol. II, p. 282). After these repulses Shihābuddīn Khān was recalled and Shāh Jehān Bahādūr Kokaltāsh was sent to lay siege to the fortress. He too, after many attempts to reduce it, failed to achieve any substantial result.

In 1683, Shihābuddīn Khān was despatched with a force towards Poona and Supā in order to establish military posts there. Before his departure, the Emperor presented him with a quiver, a bow, ten thousand rupees cash and two maunds of gold to defray the expenses of the army. (*Ma'āthir-i-Ālamgiri*, p. 242). It seems that he came back to the presence and was again, after a few months stay at the court, directed to march for the relief of prince Shāh 'Ālam in the direction of the Konkan (*Ibid.*, p. 248). The Emperor recognised his services by sending him a robe of honour, five bridles and food from the royal household, as a token of his favour. Most probably he received the title of Ghāzi-uddīn Khān also on this occasion (*Ma'āthir-ul-Umarā*, vol. II, p. 874).

Ghāziuddīn Khān (Shihābuddīn Khān) encountered a large Mahrattā force under the command of Sambhājī at Pachad in the neighbourhood of the fortress of Rāigarh. He inflicted a severe defeat on the enemy who were compelled to seek shelter inside the fortress. As he was not fully prepared to lay siege, he retired after setting fire to the outer portion of the fortress. In this expedition many Mahrattā leaders were killed and several captured, including Bidāji, Akoji Malhar and Rāo Subhānchand, whom he sent to the court and, as they whole-heartedly identified themselves with the cause of the Emperor they were duly given robes and other presents (*Ma'āthir-i-Ālamgiri*, p. 249). Ghāziuddīn Khān collected a vast booty on this occasion. When the news of this victory was sent to the Emperor, by means of Syed Ughlān and Shāh Muhammad, Chobdār, he felt extremely delighted. The former of the messengers was rewarded with an elephant while the latter obtained a robe of honour and two hundred rupees cash. The Emperor

conferred the title of Firûz Jang on Shihâbuddin Khân and also bestowed the right of playing kettle-drums. One hundred and fifty robes of honour were sent for his companions. (*Ma'âthir-i-'Âlamgiri*, p. 252.)

Knowing full well that this struggle with the Mahrâtâtas was going to be very protracted one, Aurangzib, after inflicting severe defeats on the enemy, undertook the conquest of Bijâpur. He therefore transferred his headquarters to Ahmednagar in November, 1683. The excuse for war with Bijâpur was not far to seek. The Emperor had invited Sikander Âdil Shâh, King of Bijâpur, to join him in his crusade against the Mahrâtâtas, to supply provisions to his troops from his territory and to allow passage to his armies through his realm without any restrictions whatsoever. This haughty demand of Aurangzib exasperated Sikander who sent a spirited reply, asking the former to remove the outposts that his generals had established in Bijâpur territory without any previous notice or permission. He also demanded the Emperor to return him the tribute that had been unlawfully exacted from his predecessors, by the Mughal Government. Intelligence was also brought to Aurangzib that Sikander was secretly helping the cause of the Mahrâtâtas, so he decided to annex the kingdom in order to strengthen the Imperial resources for the impending struggle for supremacy in the Deccan.

Prince Â'zam was sent to lay siege to Bijâpur in March, 1685, and a large army was despatched under his command. Sikander entrusted the defence of his kingdom to Syed Makhdûm, surnamed Sharzâ Khân, who was a military expert and a man of considerable influence. He also invited his vassal Pem Nâyak, chief of the Berad clans, to harrass the Mughal armies. The Mughals routed the Bijâpuri under the command of Sharzâ Khân on the bank of the Tungabhadra river and inflicted heavy loss. The Mughal armies under Â'zam were constantly kept harrassed by Bijâpuri contingents. Advancing slowly, they laid siege to Bijâpur and established outposts to keep up their communications with the Emperor at Sholâpur. These communications were cut off by the armies of Pem Nâyak and Siddi Mas'ûd, who, in response to Sikander's appeal, came to offer help against the Mughal advance which they considered to be dangerous for their own existence as well. Abu'l Hasan of Golconda also sent a contingent under, Ambâji Pandit, in spite of the warning sent to him by Aurangzib on this occasion. These forces occupied the country in the neighbourhood of Bijâpur and prevented all provisions from reaching the besieging army of prince A'zam. The Emperor was anxious on account of the famine prevailing in Â'zam's army. Grain became very dear and the hungry soldiery felt too dispirited to continue the siege for long. On hearing this the Emperor advised his son to raise the siege. The prince considered retreat to be beneath his dignity; he held a council of his experienced officers asking their advice what to do. He also showed them the letter he had received from the Emperor. He especially asked the opinion of Hasan 'Alî Khân 'Âlamgirshâhi who was a veteran and had great experience of warfare. The latter is reported to have said: 'In the interest of our men, it is advisable to retire'. Others also seconded this opinion. Then the prince addressed them thus: 'You have had your say, now hear mine. I, with my wife and two sons here, am not going to leave this place so long as breath is left in us. . . . You are free to do as you like'. On hearing this they all agreed to continue the siege and put up with any hardship or calamity that might befall them (*Ma'âthir-i-'Âlamgiri*, p. 264).

When news was brought to Aurangzib at Sholâpur, that prince A'zam was determined to continue the siege whatever might happen, he summoned Ghâziuddin Khân Firûz Jang, considering him to be the most suitable person to undertake any hazardous task, and directed him to march to Â'zam's relief. His brother Mujâhid Khân, and Tîr Andâz Khân, Khanjar Khân and others agreed to accompany him. Before Firûz Jang started on the expedition, the Emperor presented him with a robe of honour, a fish standard, (Mâhi Marâtib), four flags and an elephant. He was also given the

rare privilege of touching the feet and hands of the Emperor (*Ma'âthir-i-Âlamgîrî*, p. 265).

They set out with twenty thousand bullock-loads of grain in the direction of Bijâpur, 'riding on the horses of wind and lightning, to bring as quickly as possible succour to the prince'. At Indî they fought a severe action with the forces of Sharzâ Khân and 'Abdul Ra'ûf, which barred their way to Bijâpur. The escort under Firûz Jang numbered less than one-tenth of the number of the enemy who were nevertheless repulsed and compelled to disperse in different directions. Meanwhile, Pem Nâyak, Zemindâr of Wakinkherâ joined the Bijâpuris, with six thousand soldiers, swelling their number to about fourteen thousand. Firûz Jang undaunted by the superior numbers, gave them battle, resulting in his final victory and the rout of the enemy. Firûz Jang re-established the military outpost of Indî, which was situated on a strategically important site between Sholâpur and Bijâpur, and appointed I'tiqâd Khân as the Thanedâr. Saif Khân was also posted there. (*Ibid.*, p. 266).

With the arrival of Firûz Jang, the whole outlook at Bijâpur underwent a change. The disheartened soldiery revived in the stimulating presence of this hero. When prince Â'zam approached Firûz Jang, he embraced him. The marvellous feat of Firûz Jang had turned scarcity into plenty. On hearing this news the Emperor felt highly delighted and is reported to have said: 'As God almighty has saved the honour of the house of Timûr through the exertions of Firûz Jang, so may He guard the honour of his descendants till the day of resurrection.' (*Khâfî Khân*, vol. II, p. 319.)

After the siege of Bijâpur had already dragged on for fifteen months, the Emperor decided to proceed there in person and conduct the operations under his own leadership. He set out from Sholâpur on 14 June, 1686, and reached Rasûlpur, a suburb of Bijâpur, on 23 July. The presence of the Emperor encouraged the besiegers and they set heartily to work at digging trenches and filling up the moat. Ghâziuddin Khan Firûz Jang had drawn up a plan of action to reduce the fortress which was brought to the Emperor's notice and approved. The Emperor sent him an emerald ring through Siâdat Khân. (*Ma'âthir-i-Âlamgîrî*, p. 269.)

The presence of the Emperor disheartened the besieged who were extremely hard-pressed on account of lack of provisions. Their men and horses had perished in great distress. Meanwhile, the exertions of Firûz Jang and other veterans had brought the besieged to bay and had compelled them to surrender the fortress. On 10 September, 1686, Abdur Ra'ûf and Sharzâ Khân waited on Firûz Jang and concluded the terms on behalf of Sikander. Next day they were introduced to the Emperor who received them with consideration. On the 19th September, the Emperor entered the fort with pomp and display.

When Sheikh Hidâyat Kaish, reporter-general of news (*Waqâ'inavis-i-kul*), showed the Emperor the account of the siege and victory, in order to preserve it in the Imperial records office, the latter with his own pen added this sentence: 'Through the effort of the noble and dear son, (farzand arjumand) Ghâziuddin Khân Firûz Jang, the siege was brought to a successful termination.' (*Khâfî Khân*, vol. II, p. 322). Thus to his other titles Firûz Jang received the rare distinction of being addressed as 'dear son,' by the Emperor. The same words were mentioned by the Emperor in his despatch addressed to Amîr Khân, Subedâr of Kabul. Somebody composed the chronogram of the capture of the fortress in the following words: 'Sadd-i-Sikander giraft' (The sill of Sikander is taken). (*Ibid.*, p. 322).

Aurangzib had not forgiven Abu'l-Hasan for actively helping the Bijâpuris by sending a Golconda force under the command of Ambâji Pandit. Moreover, the enormous wealth and resources of the Golconda kingdom could not have escaped the notice of the Emperor. During the siege of Bijâpur, the Mughal police had intercepted a letter of Abu'l-Hasan addressed to his agents in Aurangzib's camp, telling them that

he intended to dispatch a force of forty thousand men under Khalilullah Khân to reinforce the Bijâpuris. The plan was that his force would proceed from the left flank and Sambhâji's army would come from the right flank and give battle to the Imperial armies (*Ma'âthir-i-Âlamgîrî*, p. 260). On hearing this, Aurangzib sent a large army under the command of Shâh 'Âlam to effect the conquest of Hyderâbâd. When the Imperial forces reached Malkhed, prince Shâh 'Âlam tried his best to settle terms with Khalilullah Khân and to avoid war but failed. The prince stopped at Malkhed for two months, waiting for the cessation of the rains. The Emperor, feeling dissatisfied with the progress of Shâh 'Âlam's forces, wrote him a strong letter of rebuke. On receiving this letter the prince advanced in the direction of Hyderâbâd. The Imperial forces defeated Sheikh Minhâj and Rustam Râo who offered resistance. After this the prince continued his march to Hyderâbâd unopposed. When intelligence was brought to Abu'l-Hasan of his army's defeat he was greatly alarmed and fled with a few servants by night to the Golconda fort. Great disorder prevailed in Hyderâbâd. The Imperial army attacked the city and occupied it. Shâh 'Âlam appointed officers to prevent plunder and punish miscreants. After a few days negotiations, Abu'l-Hasan agreed to pay one crore and twenty lakhs of huns annually, and to dismiss Madanna and Akanna from the service (*Khâfî Khân*, vol. II, p. 208). The Imperial armies then evacuated the territory of Abu'l-Hasan.

After the capture of Bijâpur, Aurangzib again directed his attention towards Golconda. On the pretext of paying his respects to the tomb of Gisûdarâz at Gulbarga, he advanced into the territory of the Golconda kingdom, and dispatched Fîrûz Jang to effect the conquest of Udghîr or Ibrâhîngarh, which was situated on the way to Hyderâbâd.¹ In recognition of his service, Fîrûz Jang was awarded a robe of honour and an elephant. The men who were in his escort, namely, Dilêr Khân, Sharzâ Khân, Jamshêd Khân, Mâloji Gopâl Râo, Kamâluddîn, Râo Dalpat, Saf Shikan Khân, Aqâ 'Ali Khân, 'Abdul Qâdir Khân, Jehângîr Qulî Khân, Sûfi Khân, Audat Singh Bahdâria and Sarbarâh Khân Chêla were all given robes of honour, horses, elephants, titles and promotion (*Ma'âthir-i-Âlamgîrî*, p. 284). Fîrûz Jang joined the Emperor not very far from Golconda. The latter made him Commander-in-Chief and sent him in advance to take possession of the fortress of Golconda. Fîrûz Jang, in spite of the resistance offered by the Qutub Shâhi armies, managed to reach the foot of the fortress and wanted to take it by a sudden assault. Qalich Khân, under the command of his son, led the storming party and was struck by a cannon-ball. He expired after three days. Fîrûz Jang laid regular siege which turned out to be a long, arduous affair. The besieged under the direction of Sheikh Nizâm and Abdul Razzaq showed great skill and perseverance. Fîrûz Jang directed Saf Shikan Khan to carry the trenches towards the moat and erect mounds with high batteries to bombard the fortress. The Emperor's presence also inspired the soldiery to action. When everything was ready for bombarding the besieged, Saf Shikan Khân feeling jealous of Fîrûz Jang, who had gained greater distinction in the eyes of the Emperor for his efficient siege operations, resigned from the post of chief of the artillery (*Mir-i-Atish*). Salâbat Khân and, after him, 'Izzat Khân were appointed to the post. The occasional but daring raids of the besieged had succeeded in demolishing the batteries. 'Izzat Khân was even taken prisoner by the enemy. Meanwhile the heavy rains had destroyed the mound which was made after painful and patient efforts of Fîrûz Jang and his men. In the words of Khâfî Khân, 'they had completed the work of one year in one month and a few days' (vol. II, p. 336).

The mutual jealousy of the officers was responsible for the delay in the reduction of the fortress. The state of affairs irritated the Emperor. He better consulted the interest of his cause in giving the general command of his forces to prince Muhammad

¹ This fortress was later known as Fîrûzgarh (*Ma'âthir-ul-Umarâ*, vol. II, p. 875).

A'zam, in order to remove the reason for jealousy among the nobles and high officers. Moreover, Fīrūz Jang had received two arrow wounds while he was leading the assault in presence of the Emperor himself, who riding a horse accompanied the party right up to gun-shot distance from the walls and bastions of the fortress. (*Ma'āthir-i-'Ālamgīrī*, p. 295; *Khāfi Khān*, vol. II, p. 354).

On the 16th May, 1687, Fīrūz Jang resolved to take the fort by an escalade, during the night. A ladder was fixed against the bastion and a few of the veterans ascended the ramparts. As chance would have it, a 'pariah' dog that was loitering about nearby saw them and started barking loudly. This roused the garrison from sleep. Immediately the assailants were put to the sword and others who were mounting up were killed by explosive shells.

When Hāji Mehrāb, a favourite servant of Aurangzīb, came to know of Fīrūz Jang's escalade, he went off to the Emperor early in the morning, without exactly finding out the upshot of the affair, to report the success of Fīrūz Jang's daring enterprise. The Emperor was still sitting on his prayer-carpet, reciting his prayers. He anxiously asked what brought him so early in the morning. The Emperor on hearing the happy news ordered the drums of victory to be beaten. The Emperor as well as others were sorely disappointed when the truth was known. (*Khāfi Khān*, vol. II, p. 242.)

Mīrzā Muhammad Ni'amat Khān, whose poetical sobriquet was 'Alī, found this tragic event a fit subject for his cynical writings, both in prose and poetry. (*Waqā'i Niamat Khān-i-'Ālī*.)

In September, 1687, Rūhullāh Khān managed to open secret negotiations with 'Abdullāh Khān, a confidential officer of Abu'l-Hasan who was in charge of one of the gates of the fortress, through Ranmast Khan. According to their understanding, 'Abdullāh Khān left the gate open in the last watch of the night of the 21st September, 1687 and the Mughal forces entered the fortress. The drums of victory were beaten and the fortress was captured. Abu'l-Hasan was taken captive and sent to Daulatabād to be kept in internment. He was put in charge of Jān Sipār Khān who escorted him to Daulatabād. The captors seized the spoils which amounted to 8,51,000 huns, 20,050,000 Rupees, besides jewellery, gold and silver plate of great value (*Khāfi Khān*, vol. II, p. 367).

After the reduction of the fortress, Fīrūz Jang was raised to the rank of seven thousand Zāt, and seven thousand horse. He was also awarded a robe of honour, a special suit of armour, and a jewelled staff (*Ma'āthir-i-'Ālamgīrī*, p. 296).

Now, the Emperor directed that large roving parties under his chief generals should be sent out to annex the territories of the kingdoms of Golconda and Bijāpur. In January, 1688, Fīrūz Jang was dispatched with twenty-five thousand horse to reduce the fortress of Adonī, situated on the south of the Tungabhadra, which was occupied by Siddi Mas'ūd, a slave general of Sikander 'Ādil Shāh. During the operation of the siege of Bijāpur, he had managed to carry off with him much jewellery and treasure to the fortress of Adonī (*Ma'āthir-i-'Ālamgīrī*, p. 308).

On reaching the neighbourhood of Adonī, Fīrūz Jang sent a message to Siddi Mas'ūd asking him to capitulate without bloodshed. But, as he refused to yield without a trial of strength, Fīrūz Jang started sinking mines, digging trenches and bombarding the fortress. Those who came out to offer resistance, were put to the sword. After some time, Siddi Mas'ūd, feeling that he would not be able to resist longer and that his fall was near, capitulated. He came out of the fortress, reiterating his pleas for forgiveness. The fort was occupied by the Imperial garrisons and renamed Imtiāzgarh. The Emperor was highly pleased to hear the news of the capture of Adonī. He ordered the royal band to play the notes of victory. Siddi Mas'ūd was treated with consideration by Fīrūz Jang, and his sons were brought to Aurangzīb. The Emperor, purposely, did not want to humiliate Siddi Mas'ūd by ordering him to be brought to his presence. In his absence the Emperor granted him the rank of 7,000 personal, 7,000 horse and further honoured

him by granting him the faujdari and fief of Morâdâbâd. But the responsibilities of this office were to be discharged by a deputy, because the Emperor had ordained that so long as Siddî Mas'ûd was alive he was to remain in the service of Fîrûz Jang (*Ma'âthir-i-Âlamgîrî*, p. 316). His sons, when they reached the royal presence with the golden keys of the fortress of Adonî, were duly honoured with favours and presents. An increase of 1,000 personal, 1,000 horse was made in the rank of Fîrûz Jang.¹

As the Emperor had reached Bijâpur, Fîrûz Jang joined him there after settling the administration of Adonî and its neighbourhood. The Emperor honoured him with presents. Intelligence was received that Sambhâjî and his lieutenants were creating great disturbances in the direction of Bahâdurgarh and Gulshanâbad, the Emperor directed Fîrûz Jang and Sheikh Nizâm (Muqarrab Khân), who after deserting the cause of Abu'l-Hasan had joined the Imperial service, to proceed there with a suitable force in order to re-establish Mughal supremacy in those districts. While the Mughal forces were busy in Golconda, Sambhâjî and his famous general Santâjî were raiding the Mughal territory. They had raised fresh troops and had considerably increased their military strength.

When preparations were being made to start a vigorous offensive against the Mahrâtts, the plague epidemic broke out in November, 1688, in the royal camp at Bijâpur. It was so virulent that very few who were infected with it could manage to survive. The queen-consort, Aurangâbâdî Mahal, Mahârâjâ Jaswant Singh's son who was only thirteen years old and who was brought up with the Imperial family and Fâzil Khân, sadr, besides many other nobles and officers died. Nearly a hundred thousand souls perished in this terrible pestilence. The Emperor had to move his camp from Bijâpur to Aklûj in the Sholâpur district. Fîrûz Jang also caught the infection at Bijâpur before his departure for Bahâdurgarh and lost his eye-sight (*Ma'âthir-i-Âlamgîrî*, pp. 318-19). On account of his ill-health he could not undertake the expedition against the Mahrâtts, and the credit of capturing Sambhâjî went to Sheikh Nizâm (Muqarrab Khân) who was honoured with the title of Khân-i-Zamân Bahâdur, Fateh Jang, a gift of fifty thousand Rupees cash, a special robe of honour, a horse with jewelled trappings, an elephant with gold-mounted trappings, a jewelled poniard and an increase of five thousand to his present rank. His elder son Ikhlâs Khân was raised to the rank of 5,000 personal, 5,000 horse with the title of Khân-i-Âlam, and his younger sons, Sheikh Miran and Sheikh 'Abdullâh were given the titles of Munawwar Khân and Ikhtisâs Khân respectively.

The Emperor was now determined to reduce all the strongholds of the Mahrâtts. He started his offensive in right earnest. It'iqâd Khân, later known as Zulfiqâr Khân Nusrat Jang, invaded the Konkan and reduced the famous fort of Raigarh in October, 1689. Shîvajî's widows, Sambhâjî and Râjâ Râma's wives, daughters and sons were captured and sent to the Imperial presence. Zulfiqâr Khân Nusrat Jang received a gift of three thousand Rupees cash, a special robe of honour, a jewelled quiver and a bow. His rank was increased to 3,000 personal, 2,000 horse (*Ma'âthir-i-Âlamgîrî*, p. 332).

These repulses determined Râjâ Râm, brother of Sambhâjî, to re-organise the military forces of the Mahrâtts and to drive out the Mughals from their country. The post of Senâpati or Commander-in-Chief was given to Santâjî Ghorpâde. He enrolled fresh soldiery to the number of hundred thousand. Twenty thousand were kept actively engaged with the Imperial forces in Western Deccan; ten thousand were in the escort of Râjâ Râm; the remainder were divided in three flying columns of twenty thousand each,

¹ According to Khâfî Khân, Siddî Mas'ûd requested the Emperor through Fîrûz Jang, asking to be excused from going to his presence and to be allowed to send his sons instead. (Vol. II, p. 272).

commanded by Santâjî Ghorpâde, Parsojî Bhosle and Sindojirâo Nimbalkar respectively. The activity of these columns had begun to cause a great deal of harassment to the Emperor. The Mahrâtta free-booters were disturbing the whole of the Deccan, Konkan and Western Carnatic. Santâjî had seized several fortresses from the Mughals in the neighbourhood of Balgâon, while other Mahrâtta columns were also making themselves felt by the Imperialists. Of these Mahrâtta generals, Santâjî had become a terror for the peaceful populace as well as the Mughal armies. After harassing the Imperial forces under the command of Zulfiqâr Khân in the Carnatic, Santâjî started his surprise attacks in the Western Deccan. Qâsim Khân was directed to march against him. He was severely defeated by Santâjî and compelled to surrender the fortress of Dodderi. Himmat Khân who was sent by the Emperor to reinforce Qâsim Khân was met by Santâjî's forces on the way and slain in action.

Santâjî had reached the height of his power when he quarrelled with Dhanâ Jâdav who felt wronged on the promotion of the former to the post of Commander-in-Chief. Dhanâjî Jâdav resolved to decide the issue between himself and his rival at the point of the sword and started raising fresh troops. On his part Santâjî could not allow his rival to raise fresh soldiery and thus become a danger to his existence. He followed him into the Mahrâtta land. In March, 1697, their armies met in the neighbourhood of Bijâpur. The Emperor had also given orders to pursue Santâjî whose ravages had wrought havoc in this part of the country. Fîrûz Jang got intelligence that Santâjî, at the head of twenty-five thousand horse, was only eighteen miles from Bijâpur. Fîrûz Jang thought it advisable to avoid a direct clash with him and to proceed in the direction of Bijâpur in order to enlist reinforcements. Meanwhile, he was informed by his agents that Dhanâ Jâdav and Hanu-mant Râo had formed a strong combination against Santâjî and that they were going to be engaged in a bloody battle. He marched in that direction and was informed that Santâjî had suffered a severe defeat and that he had taken to flight. His army was corrupted and most of his men joined the opponents' camp. Santâjî was left isolated and the few who remained loyal to him were dispersed in various directions. He was captured and slain by Nâgojî Mânê who had been in the Imperial service for some time but subsequently joined his own people. He had a grievance against Santâjî who had his brother trampled to death for some military offence. Santâjî, being a man of over-bearing temperament, ready to take the most extreme measure for some small neglect or offence, was unpopular among a certain class of Mahrâtta soldiery.

According to Khâfi Khân, Santâjî, worn out and tired was bathing in a stream when he was captured and killed by Nâgojî Mânê, who cut off his head and, putting it in a bag, fastened it behind his saddle. On his way back to Dhanâ Jâdav, the bag got unfastened and fell down without his noticing it. As chance would have it, Fîrûz Jang's scouts, who were in pursuit of Santâjî, passed that way. They picked up the bag and recognised the head of Santâjî; they immediately carried it back to Fîrûz Jang. The head was sent to the Emperor who gave the messenger, Khwâja Bâbâ-i-Tûrânî, the title of 'Khush Khabar Khân' (Lord Good News). The head was exhibited in the principal cities of the Deccan. (*Khâfi Khân*, vol. II, p. 448; *Ma'âthir-i-Âlamgiri*, p. 402).

Now the Emperor, along with his campaigns against the Mahrâtts in the Deccan and the Carnatic, undertook to consolidate the territories that had fallen to him after the dismemberment of the Adil Shâhi and the Qutub Shâhi kingdoms. He sent Fîrûz Jang to Berâr to organise the administration there. He stayed there for nearly two years. Then he was summoned to court in 1700 when his advice was sought in connection with the revival of the Mahrâtta activity. Fîrûz Jang was directed to relieve Jumdat-ul-Mulk Asad Khân in command of the camp of Islâmpurî, which was considered

to be one of the most important military stations on account of its strategic position.¹ The Emperor showed consideration for the disability of Firūz Jang (his blindness) and desired him to stay in one place instead of moving about in different directions like other Imperial generals.

A year after this, the Emperor, on his way back from Bahādurgarh, happened to pass near Islāmpurī. According to his usual practice, he came down to inspect Firūz Jang's camp. He was surprised to see his retainers in such a well-equipped condition. The camp was splendidly kept. The soldiery were undergoing the best discipline. He had a huge force of artillery at hand, the like of which no other Imperial general possessed. Firūz Jang offered many presents to the Emperor who accepted only one small poniard (*nimcha*) and gave it the name of 'Ghāzibacha' (son of Ghāzi). The Emperor also took some of the ordnance along with him and issued orders that the nobles and generals should not be allowed to keep more than a fixed quota of artillery. A despatch was immediately sent to prince Bidār Bakht saying: 'Firūz Jang who is only a "haft-hazāri" (master of seven thousand) spends his own money on all manner of armaments, including cannon, matchlocks, and small cannon, and possesses a large quantity of all necessary equipments. For this he does not get anything extra from the Imperial treasury except what is fixed for him. You, who get so much more than he does, squander money needlessly. You spend for things for which you should not.' (*Ma'āthir-i-'Ālamgīrī*, p. 469).²

For nearly two years Firūz Jang did not move out from Islāmpurī. But during this time he continued to show interest in the administration of Berār. It was through his recommendation that the Emperor appointed Rustam Khān, in whom he had complete confidence, as the deputy governor of Berār (*Ibid*, p. 493). The Emperor again sent Firūz Jang to take charge of the governorship of Berār and to check the advance of Nemāji Sindhīā who had defeated and captured Rustam Khān. This general led the Mahrāttā counter-offensive in Berār and Mālwa. He, besides other Mahrāttā chiefs, had enlisted a huge army in order to ravage Mughal provinces. He had established himself in Central India during the regency of Tārābāi, who had taken the reins of power in her hands in the name of her son Shivāji who was not yet ten years of age. The Imperial armies were getting dispirited on account of the repeated reverses they met at the hands of Nemāji Sindhīā and Dhanā Jādav, who had thrown all their energies into the task of marshalling the forces of their people to overthrow the Mughal domination.

Nemāji Sindhīā, after inflicting a crushing defeat on Rustam Khān crossed the Narbada river and carried his predatory raids as far as Mālwa. He negotiated terms with Chatrasāl of Bundelkhand, to join forces against the Mughals (*Ma'āthir-i-'Ālamgīrī*, p. 483). Firūz Jang pursued Nemāji Sindhīā who came out to offer battle in the neighbourhood of Sironj. The Mahrāttās were severely beaten and their armies fled and dispersed. It is said that Firūz Jang forced his way to the elephant on which Nemāji Sindhīā was riding, but the latter leaped down and took to flight on a horse. The Imperial armies took back all the baggage and effects which Nemāji Sindhīā had seized from Rustam Khān in Berār. He was compelled to take refuge in the forests of Bundelkhand with Chatrasāl. As a recognition of these services in the Imperial cause, Firūz Jang was honoured with the title of Sipāh-i-Sālār (Commander-in-Chief), an increase of two thousand horse in his Mansab and a reward of one crore dām in cash (*Ibid*, p. 481). Dilār Khān who was one of the chief officers of Firūz Jang was also raised to the rank of 7,000 personal, 7,000 horse.

¹ The original name of this place was Brahampurī. Aurangzib gave it the name of Islāmpurī and made it the base-camp for his armies which were busy checking the Mahrāttā counter-offensive between Bijāpur in the south and the Manjira river in the north. Islāmpurī served as a point, joining a series of points, from whence military operations originated.

² Saif Khān was directed not to advance any further sums of money to Bidār Bakht without the Imperial permission. See *Farāīn-i-'Ālamgīrī*, Asafīa Lib. Persian MS., No. 1275 (Tarikh).

Firūz Jang, during his campaigns against Nemāji Sindhiā in Mālwa, did not get much help from the local Mughal authorities who, terrified by the presence of vast Mahrattā forces in their territory, hid themselves in their fortresses instead of taking the field against their inroads. When the Emperor was apprised of this state of affairs in the local administration of that province, he took strict measures by dismissing Nawāzish Khān from the faujdārī of Mandū and transferring him to Khāndesh, but he was reinstated later. Thinking minor official changes to be ineffective, the Emperor appointed Bidār Bakht as the Governor of the province of Mālwa in place of Abu Nasr Khān, son of Shāistā Khān who was transferred to Bengal, then a comparatively peaceful province (*Ma'āthir-ul-Umarā*, vol. I., p. 293).¹

Firūz Jang, continuing his pursuit of Nemāji, set out from Bhāmgarh on 10 February, 1704, to proceed against Chatrasāl, via Chandēri, and Dhamunī towards Garha. His general, Khanjar Khān, who was leading the vanguard, succeeded in dispersing the columns of the enemy by his surprise attacks. After this Firūz Jang returned to Burhānpur and from thence to Berār, as his presence was urgently required there.

Nemāji Sindhiā had captured Mughal outposts on the Narbada. For several months, the highways between North India and the Deccan were held up by the Mahrattās. In the beginning of March 1704, some 355 bags of official correspondence and 55 baskets of fruits sent for the Emperor by the Subedārs of Kabul and Kashmir, were lying on the bank of the Narbada, as the faujdārs on the way could not supply adequate escort to take them to their destination (Sarkar, vol. v., p. 386).

At the time of Aurangzib's death which occurred on the 3rd March, 1707, Firūz Jang was at Ellichpur as the governor of the Berār province. Almost all the chief nobles in Deccan made their submission to prince Ā'zam. Some espoused his cause because they really liked him, while others from inability to oppose prudently joined him and submitted to his authority. Chin Qalich Khān (Nizām-ul-Mulk) and his cousin Muhammad Amin Khān also joined Ā'zam in his march to Aurangābād. Ā'zam bestowed the title of Khān-i-Daurān on Chin Qalich Khān, in order to conciliate him and through him the Tūranī soldiery. But they soon felt disgusted at the haughty and slighting behaviour of the prince towards his chiefs and nobles. Ā'zam constantly treated the old veterans with contempt. He removed Tarbiat Khān from the command of the artillery in the most insulting manner and conferred that post on a young man of low rank and no experience (*Irādat Khān*, p. 12). The prince was filled with such an overwhelming pride and arrogance that Chin Qalich Khān and Muhammad Amin Khān felt sick of his behaviour and decided to leave him and remain neutral in the impending contest that was going to take place between the sons of Aurangzib to secure the throne. Both of them, with their troops, left the prince and took possession of several districts in the neighbourhood of Aurangābād (*Khāfi Khān*, II, p. 572).

Ā'zam knew that Firūz Jang also did not desire to take any active part in the internecine warfare that was going to ensue after the death of the Emperor. Although enraged with Firūz Jang, he thought it advisable to put him in charge of Burhānpur, as

¹ The Emperor wrote the following strong-worded despatch to Abu Nasr Khān: "In spite of the going of Firūz Jang, rightly so named, in pursuit of the marauders (i.e. Mahrattās), why were you sitting down in your fortress gazing at the show? If you wish to remain in my service, then, now that Firūz Jang, after defeating Nemā near Sironj, is chasing him and the latter is fleeing towards Bundelkhand and Garha (Mandla), you should issue forth, take the militia, assemble the faujdārs and the captains posted there, and attack, expel, slay and bind the scattered bands of the enemy roving without leaders and the rebel Afghans,—who seeing the field empty are molesting the peasantry. Send Nawāzish Khān to Burhānpur. Take Mandū as your own Jāgir and entrust Dhar to the new qiledār appointed.

Nawāzish Khān was addressed thus: 'At the request of Nusrat Jang (the Imperial paymaster) you have been retained in service, but you have not been your own self. What do you mean by vacating Mandū and hiding yourself in Dhar? Come to Burhānpur and serve under Bidār Bakht. I shall give you Jāgirs in the Deccan or if you prefer an annual stipend of 20,000' (*Kalimāt-i-Tayyibāt*, Asafā No. 112. Inshā').

his nominee, before starting on his march to North India, and thus prevent him from taking any other course which might prove suicidal for his interest in the Deccan on account of the presence of Kām Bakhsh in that part of the country. It was safer to leave Fīrūz Jang behind as a friend than as a foe.

According to *Ma'athir-ul-Umarā*, when Zulfiqār Khān joined Ā'zam, in the neighbourhood of Aurangābād, he asked Zulfiqār Khān for advice, who is reported to have replied thus: "It would be wiser and more prudent to leave your family at Daulatābād, as your father, the Emperor Aurangzib, did when he was marching against Dārā Shikūh, in similar circumstances. The soldiers are in great distress. You should pay them for two months in advance from the treasure you possess, in order to conciliate them before they enter into the struggle on your behalf. It is better to advance from the pass of Deval Ghāt instead of Fardāpur, so that you may pass near the headquarters of Fīrūz Jang. This will afford him an opportunity to join you.' The prince in his usual overbearing manner replied: 'It would certainly have been advisable to leave the family behind at Daulatabād, if the enemy was like Dārā Shikūh. We know what Mu'azzam is? His men are only taught courtesies. They have no idea of warfare, while I expect great things from my men. As for Fīrūz Jang, I do not deem it advisable to leave the direct route for the sake of a blind man like him.' (vol. II, p. 877-78).

The battle of Jājāū, fought in the neighbourhood of Agra, decided the fate of the Imperial throne in favour of Mu'azzam. Ā'zam and his son Bīdār Bakht were killed and Mu'azzam proclaimed himself king with the title of Bahādūr Shāh. He adopted a policy of general conciliation and forgiveness of offences. All those who had joined Ā'zam or Kām Bakhsh, who had rejected Bahādūr Shāh's overtures, were treated in a most generous manner. When certain envious persons brought to the notice of the new Emperor that it was dangerous to repose confidence in the followers of Ā'zam, he replied that if his own sons had been in the Deccan at that time, the exigencies of the situation would have left no other alternative for them but to join their uncle (*Khāfi Khān*, II, p. 600).

The Emperor invited the leading nobles of the realm to the court. A similar invitation was sent to Fīrūz Jang, who was much in dread of Bahādūr Shāh because, during the siege of Golconda, it was on his report that the Emperor disgraced the latter and put him into confinement. But the letters sent by Mun'im Khān, chief minister of Bahādūr Shāh, reassured him. In the words of Irādāt Khān, 'that experienced statesman, opening his eyes on the vicissitudes of life, saw that it was his interest, if his Majesty would forget the past and not molest him in his fortune, to bow his head in submission. . . . He embraced the promises of the Minister and thankfully accepted the Subedārī of Ahmedābād (Gujarāt). He accordingly crossed the Nerbada and left the Deccan without trouble, but his fears prevented him from coming to the court' (p. 52).

Fīrūz Jang obtained exemption from the duty of waiting on the Emperor in person. He excused himself on account of his disability (being blind for nearly eighteen years), saying that even the Emperor Aurangzib out of regard for his past services had not required him to wait in person.

According to the orders of the Emperor, Fīrūz Jang undertook the administration of Gujarāt. Abdul Hamīd Khān Diwān of the province, Mehr 'Alī Khān Bakhshī and Muhammad Beg Khān received the new Subedār. The first thing Fīrūz Jang did was to appoint new faujdārs and thanedārs in different localities of the province. He appointed Syed 'Āqil Khān as the Mutasaddī (collector) of the estates of prince Jehāndār Shāh. He was also given the Thanedārī of Pethapur which used to be held by his brother Mīr 'Abdul Wahhāb who was killed in a battle against the Mahrāttās. Muhammad 'Āli Khān, the father of the author

of Mir'ât-i-Ahmedî, was confirmed in the post of Waq'ae-i-nigâr (*Mir'ât-i-Ahmedî*, vol. I, p. 383).¹

Intelligence was brought to Bahâdur Shâh that Râjâ Ajit Singh of Jodhpur was in open rebellion for some time and refused to recognise the authority of the Emperor, and that he, after defeating Jafar Qulî, the deputy faujdâr of Jodhpur, had taken possession of Ajmer and other Imperial territory. The Emperor directed Fîrûz Jang to march against Râjâ Ajit Singh and restore order in the disturbed area in Râjputâna. Fîrûz Jang, on receiving the Imperial orders, enlisted three thousand cavalry and five thousand infantry, besides the troops of his old establishment, on the salary of Rs. 35 monthly to the cavalry soldiers and Rs. 4 to infantry troops. This amounted to monthly expense of 1 lakh 35 thousand rupees. In accordance with Imperial orders, Abdul Hamîd Khân, and Shari'at Khân, Provincial Diwâns, entrusted the sum of eleven lakhs of Rupees to Fîrûz Jang, for payment to local militia during eight months and 24 days. The Emperor also directed the Diwâns to provide Fîrûz Jang with fifty wheeled field-pieces, one hundred and fifty camel-guns, three thousand rockets, one thousand maunds of lead, one thousand maunds of powder and one hundred maunds of squibs from the Imperial artillery and to send two hundred diggers, one hundred axe-men and one hundred water-carriers along with the army (*Mir'ât-i-Ahmedî*, vol. I, p. 306).

On the eve of his departure for the Râjputâna expedition, Fîrûz Jang felt ill but recovered after a few days. He celebrated his recovery by treating sumptuously the nobility, the learned and the Syeds of the place. The celebrations continued for three nights consecutively. Illuminations were held on the banks of the Sâbarmatî river and fireworks were displayed (*Ibid.*).

Fîrûz Jang set out from Ahmedâbâd in the direction of Mârwar. His first halt was at the village of Achir on the Sâbarmatî river. Here he received presents and tribute from the landholders. His next halt was at Ider. Here Fîrûz Jang received the fifty spies sent by the Emperor at his request in order to keep him well-informed concerning the movements of Râjâ Ajit Singh. The spies also demanded their pay in advance like the soldiery. The matter was represented to the Emperor by urgent messengers, and he directed the Bakshî of Ahmedâbâd to accede to their demand.

When Fîrûz Jang reached Danta he had a relapse of drowsy. Very soon he grew weak and was compelled to return to Ahmedâbâd for treatment. After a short illness he expired (1710). On hearing the news of his death, the Emperor sent a firmân to the Diwân, directing him to escheat the property of the late Fîrûz Jang. The Emperor was informed that 'Iwaz Khân, collector of Fîrûz Jang, started distributing large sums to the troops and did not allow the property of the deceased noble to be attached. He also realised large sums of money for himself on the pretext of paying off the debts of Fîrûz Jang. Jai Kishan, Diwân of Kârkhâna had forged several State documents in order to appropriate certain sums in his charge (*Mir'ât-i-Ahmedî*, vol. I., p. 391).

Bahâdur Shâh directed Muhammad Beg Khân, deputy of Fîrûz Jang and faujdar of Patan and Amânat Khân (later known as Shahâmat Jang) collector of the port of Sûrat, to attach all the property and effects of the deceased Subedâr. He noted down the detailed description of each article so that everything could be checked at the capital. Jai Kishan, Almâs, and Nîkrûz (all the three eunuchs) were arrested, and responsible men took charge of the treasure and stores. His estate consisted of 1½ lakhs of rupees in bills on bankers, 133,000 gold muhars, 25,000 huns (gold) and nim-paoli

¹ The other appointments are: Mu'tamad Khân, Qiledâr of the fortress of Japavir; Mir Abul Baqâ, Kotwâl and Inspector of cloth-store (Gathapârchâ); Mir Abu Qâsim, Amin, in place of Sheikh Najmuddin; Muhammad Hâtîm Beg, Dârogha of scarf-weavers (chira bâf Khân); Khwâja 'Iwaz Khân, Dârogha of the city-treasury; Sheikh Nûrullâh, Dârogha of provincial treasury; I'timâd Khan, collector (Mutasaddî) of Khambâyât in place of Amânat Khan, and Thânedar of Kajna in place of Syed 'Alî Khân. (*Mir'ât-i-Ahmedî*, vol. I., p. 304).

(gold), 17,000 paoli (gold), 400 adheli (half) and 8,000 whole silver paoli, 140 horses, 300 camels, 400 oxen and 38 elephants (*Later Mogols*, vol. I., p. 270).

The escheat of deceased nobles' property was in accordance with the time-honoured practice of the Mughal Government. Moreover, this measure was necessary, in this case, in view of the fact that Firūz Jang shortly before his death had taken big sums of money from the State. As the Rājputāna expedition was dropped, eleven lakhs of Rupees were to be refunded to the State, which were given to him for the purposes of the expedition against Rājā Ajit Singh of Mārwar. This measure was meant to ensure the payment of the money drawn from the Government treasury. But certain foreign writers seem to have been misled by the appearance of this custom. The Government could not lay hold on all the possessions and effects of the defunct nobles and officials, as they seem to have conceived.¹ The firmān of the Emperor Aurangzib, dated 24th July, 1666, addressed to the provincial Diwāns of the realm, expressly lays down that only the property and effects of those deceased officials should be attached who owed anything to the crown.²

Firūz Jang died at the age of sixty two (lunar) years. His remains were carried to Delhi and buried in a tomb which he had had built during his lifetime in the neighbourhood of the Ajmerī gate, not far from the resting place of Shāh Wajihuddin. (*Ma'āthsir-ul-Umarā*, vol. 2., p. 878).

Firūz Jang was the leader of the Tūrānī Mughals. He was a very able and efficient general. He had acquired a most powerful influence in the Deccan. This is why his presence there was represented to Bahādur Shāh as dangerous. All his life he remained faithful to the Crown. Envious persons tried to misrepresent him to the Emperor Aurangzib, but he always had the greatest confidence in him and remained fond of him, as is shown by the letters of the Emperor addressed to him.³ His character is well described by Khāfi Khān in the following words: 'He was a man born to victory, and a disciplinarian who always prevailed over his enemy. An aristocrat of such rank and power and yet so polite and good-natured has rarely been seen or heard of among the men of Tūrān' (vol. 2., p. 671).

After the death of his first wife Safia Khanum, who bore him Qamruddin (Nizam-ul-Mulk Āsaf Jah) he married two daughters of Hifzullāh Khan, son of Ṣadullah Khan, one after the other and left no issue by them.

¹ Manucci's *Storia do Mogor*, vol., II. p. 417; (*Bernier's Travels*, pp. 163, 211 and 212).

² The Firmān is worded thus:

'Whereas if a servant of the Emperor dies leaving no heir and owing nothing to the State, all his possessions should be deposited in charge of the store-keeper of the Bait-ul-Māl. If the deceased owes anything to the Crown then only the amount due should be taken and the rest should be deposited in the Bait-ul-Māl. If he leaves an heir who has a claim on his property, then in that case the effects of the deceased should be attached after waiting for three days. If the property exceeds the amount of the debt he owes to the State, then in that case only the amount due should be subtracted and the balance delivered to the lawful heir after the latter had legally established his right. If the claims of the State exceed the worth of the property, then everything should be attached. If the deceased owes nothing to the Crown after legal proof, the whole property should be rendered to the heir' (*Mir'āt-i-Ahmedi*, vol. I., pp. 266, 67; Sir J. Sarkar is the first to point out this firmān. See *Mughal Administration*, p. 168.

³ *Ruq'āt-i-'Ālamgārī*.

THE METEORITE FALL OF 1928 NEAR PURNA

BY

MOHD. A. R. KHAN

A shower of meteorites occurred at about 5 p. m. on 29th September 1928 in the fields of Naoki, Kawagaon and Malegaon, Purbhani District, in the Dominions of His Exalted Highness the Nizam of Hyderabad, on an area of about $2\frac{1}{2}$ square miles, when it was raining slightly and the sky was covered with thick clouds. In due course it was reported by the District Police authorities to the Director-General of Police but the undersigned came to know of it only recently. On referring to the Director-General, Mr. J. E. Armstrong, O. B. E., C. I. E., he very kindly lent his office file which shows that the District Superintendent of Police, Purbhani described the fall of one stone at Naoki and of two (or more stones) at Kawagaon. These are designated here as I (s), II (s) and N (s) respectively.

There is also the Circle Inspector's report which describes the fall of altogether 4 stones, two at Naoki, one at Kawagaon and one at Malegaon, designated here as I (c) and II (c); III (c); and IV (c) respectively,

It seems that I (s) and I (c) are identical, II (s) and IV (c) are identical and N (s) and III (c) are identical with the difference that the Police Superintendent's report implies fall N (s) to consist of more than one meteorite, whereas the Inspector's report represents fall III (c) to consist of only one.

Mr. S. S. Mills, Deputy Director-General of Police, brought the matter to the notice of Dr. L. L. Fermor, Director, Geological Survey of India, Calcutta, and it appears from the file that the Police Department sent 3 stones to Dr. Fermor, one on 28th October 1928, described by Mr. Mills as 'measuring 6" x 6" x 4", surface of blackish colour as though it has been burnt and its section of slaty grey colour and rough texture, very heavy', the 2nd on 19/22 November 1928, and the 3rd on 3rd January 1929 (recovered from Abdullah bin Mahroos, an Arab of Nander).

(1) FALL I (C) OR I (S) AT NAOKI.

About 265 paces towards the north of the inhabited part of Naoki is situated the field of one Pandoji, son of Mohnaji, a shepherd, Survey No. 76. One stone fell on the border of this field near a brook. Sadhu son of Rama, and Dharmaji son of Raiji, after grazing their cattle, were returning to their homes through the field of Pandoji at about 5 p.m. while it was raining slightly. All of a sudden they heard three loud reports like the firing of guns. They looked in surprise round about them but saw nothing. Suddenly at a distance of some 145 paces from them they saw something black fall in the wet ground, splashing the mud to a height of about 5 feet and penetrating into the soil (as was found out afterwards) to a depth of about half a yard. They reported this matter to the village people: Babu Rao, son of Lalia, Deo Rao and Khopraji etc., who went out the next day at about 8 or 9 a.m. and, noticing the depression in the ground, dug out a black stone, which was sent later by the Police Muntazim of Purna to the District Superintendent of Police, Purbhani.

For 2 days after the fall (while the sky was still cloudy and rain was falling heavily) the village people were so frightened that they abandoned the road 'for fear of being struck by stones falling from heaven'.

PLATE I



Fig. 1

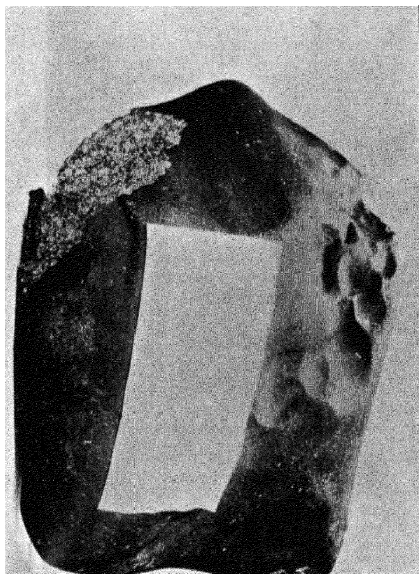


Fig. 2

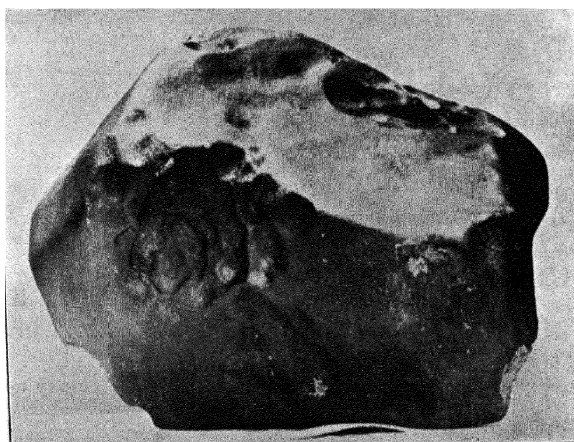


Fig. 3

(2) FALL II (C) AT NAOIKI.

This occurred near the centre of the field of Massaji (Revenue Survey No. 45), which is situated at about 2,280 paces to the south-west of the inhabited part of Naoki. The fall was witnessed by one Okerya, from a distance of 15 paces, by Hanoomaji, shepherd, from a distance of 25 paces and by Dagroba, shepherd from a distance of 19 paces. These people were grazing their cattle at the time. (The stone was dug out by Atthia, who gave it to Shaikh Mohiuddin, a resident of Arandesar, who in turn passed it on to Arab Abdullah of Nander.)

(3) FALL III or N (S) AT KAWAGAON

One stone fell in Mohnaji shepherd's field, Survey No. 7, situated about half a mile to the west of the inhabited part of Kawagaon.

The Circle Inspector, writing about this fall to the District Superintendent of Police, Purbhani, says that 'Mohnaji son of Kishnaji, shepherd, gave evidence that he owned a field (Survey No. 7) in Kawagaon. He heard 3 loud reports on 29th September 1928 at 5 p.m. and forthwith saw black stones fall from the sky at a distance of 12 paces from him. He dug up one stone immediately from the wet soil, which was afterwards handed over to the Police authorities. He further writes that several people have seen such stones being carried by rail to Nander and Hyderabad also. Later, the District Superintendent of Police, Purbhani, forwarded one stone to the Director-General and wrote that the 1st Taluqdar had retained some stones.'

The writer of this account has seen two of these stones, one in the possession of Mr. Ghulam Ahmad Khan, now 1st Talukdar of Aurangabad and the other in the possession of Professor Hosain Ali Khan. The latter stone weighs 10,320 grams (or nearly 22·7 lbs.) with specific gravity 3·49 and is composed mainly of nickel-iron grains and troilite, olivine and enstatite. Its greatest length is about $11\frac{3}{4}$ inches and greatest breadth $6\frac{1}{2}$ inches, greatest lengthwise perimeter $23\frac{1}{2}$ inches and greatest breadthwise perimeter 20 inches. Its surface (where it is unbroken) is covered with the usual thin black crust of stone meteorites and is pitted. The inner portions are much lighter in colour and very friable (vide photographs 1, 2, 3.) The former stone appears to be of the same texture but is somewhat smaller.

It may be of interest to note that the specific gravity of a complete specimen of stone meteorite which fell at Holbrook, Arizona on July 19th 1912 is 3·48 and of a similar specimen which fell at Forest City, Iowa on May 2nd 1890 is 3·69, as examined by the present writer.

Mr. Mills in his letter to Dr. Fermor writes that the people who saw the splashing of mud by the fall of the meteorites could not say whether it was the sound of something hot falling into water and that they did not observe any luminous phenomena.

It is now an almost established fact that stone meteorites reach the earth as comparatively cold bodies. The 'ball of fire' stage of meteorites (of ordinary size) whether iron or stony, ceases at a height of above five miles from the ground. Iron meteorites retain some of the heat they develop during their flight in the higher regions of the atmosphere but the stony varieties fall mostly as comparatively cold masses. Two well-known specimens (Dhurmsala meteorite which fell on July 14th 1860 and the Alfanello meteorite which fell on February 16th 1883—specimens of both of which are now in the possession of the writer, picked up by people soon after their fall, were found to be ice-cold. The heat evidently had no chance of penetrating into their interior owing to poor conductivity of the material and was quickly radiated during their fall in the lower layers of the atmosphere.

It is a pleasure to acknowledge with thanks the courtesy of Mr. Armstrong in allowing the use of his office file and of Professor Hosain Ali Khan in lending the meteorite to have it photographed.

“ON A FOURTH ORDER PARTIAL DIFFERENTIAL EQUATION”

BY

RAZIUDDIN SIDDIQUI

We consider the non-linear partial differential equation

$$(1) \quad \frac{\partial^4 u}{\partial x^4} + \frac{\partial u}{\partial t} = P(x, t; u),$$

and try to determine a solution $u(x, t)$ which is regular in the domain

$$(2) \quad 0 < x \leq \pi, \quad 0 \leq t,$$

and which satisfies the boundary conditions

$$(3) \quad u(0, t) = u(\pi, t) = 0 \text{ for all } t > 0$$

and

$$(4) \quad u(x, 0) = f(x) \text{ for all } x \text{ in } 0 \leq x \leq \pi.$$

In order that conditions (3) and (4) should be consistent, it is necessary that

$$(5) \quad f(0) = f(\pi) = 0.$$

We assume further that $\frac{d^4 f}{dx^4}$ exists, and can be represented as an indefinite integral. These conditions are sufficient for $f(x)$ to be capable of being expanded in a Fourier Series of the form

$$(6) \quad f(x) = \sum_{n=1}^{\infty} c_n \sin nx$$

such that $\sum_n n^4 |c_n|$ is convergent :

$$(7) \quad \sum_n n^4 |c_n| = c,$$

where c is an absolute constant.

We take $P(x, t; u)$ to stand for the power series

$$(8) \quad P(x, t; u) = \sum_{r=2}^{\infty} p_r(x, t) u^r$$

and assume that the co-efficients, $p_r(x, t)$ and their derivatives $\frac{\partial p_r}{\partial x}$, $\frac{\partial^2 p_r}{\partial x^2}$ are continuous and uniformly bounded in the domain (2) :

$$(9) \quad \left| p_r(x, t) \right|, \left| \frac{\partial p_r}{\partial x} \right|, \left| \frac{\partial^2 p_r}{\partial x^2} \right| \leq M, \quad (r=2, 3, \dots).$$

For the solution we write

$$(10) \quad u(x, t) = \sum_{n=1}^{\infty} v_n(t) \sin nx,$$

and assume for the present that the series on the right converges absolutely and uniformly in the domain (2). The solution (8) satisfies already the condition (3). In order that it may satisfy condition (4) also, we must have, on account of (6),

$$(11) \quad v_n(0) = c_n \quad (n=1, 2, \dots)$$

Moreover, from (10) we have:

$$(12) \quad \begin{aligned} \phi_r(x, t) u^r &= \sum_{n=1}^{\infty} \sin nx \cdot \frac{2}{\pi} \int_0^{\pi} \phi_r(y, t) \left\{ \sum_{j=1}^{\infty} v_j(t) \sin jy \right\}^r \times \\ &\quad [\sin ny dy, \\ &= \sum_n \mathcal{Z}_n^{(r)}(t) \sin nx, \end{aligned}$$

where

$$(13) \quad \mathcal{Z}_n^{(r)}(t) = \sum_{l_1, l_2, \dots, l_r} a_{l_1, l_2, \dots, l_r}^{(n)}(t) v_{l_1}(t) v_{l_2}(t) \dots v_{l_r}(t),$$

and

$$(14) \quad a_{l_1, \dots, l_r}^{(n)}(t) = \frac{2}{\pi} \int_0^{\pi} \phi_r(y, t) \sin l_1 y \dots \sin l_r y \sin ny dy.$$

We assume, what will be proved later, that the series $\sum_n n^4 v_n(t)$ and $\sum_n \frac{d v_n}{dt}$ are also absolutely and uniformly convergent for all t ; then we get on substituting (10) and (12) in the differential equation (1):

$$(15) \quad \sum_{n=1}^{\infty} n^4 v_n(t) \sin nx + \sum_{n=1}^{\infty} \frac{d v_n}{dt} \sin nx = \sum_{n=1}^{\infty} \sum_{r=2}^{\infty} \mathcal{Z}_n^{(r)}(t) \sin nx.$$

So that for all positive integral n , we have

$$(16) \quad \frac{d v_n}{dt} + n^4 v_n(t) = \sum_{r=2}^{\infty} \mathcal{Z}_n^{(r)}(t).$$

A solution of this equation which satisfies the condition (11) is

$$(17) \quad \begin{aligned} v_n(t) &= c_n e^{-n^4 t} + \int_0^t \frac{-n^4}{e} (t-s) \sum_{r=2}^{\infty} \mathcal{Z}_n^{(r)}(s) ds, \\ &= c_n e^{-n^4 t} + \int_0^t \frac{-n^4}{e} (t-s) \sum_{r=2}^{\infty} \frac{1 \dots \infty}{\sum_{l_1, \dots, l_r} a_{l_1, \dots, l_r}^{(n)}(s)} v_{l_1}(s) \dots v_{l_r}(s) ds. \end{aligned}$$

We set

$$(18) \quad w_n(t) = n^4 v_n(t), \quad d_n = n^4 c_n,$$

and get from (17) for all $n \geq 1$

$$(19) \quad w_n(t) = d_n e^{-n^4 t} + n^4 \int_0^t \frac{-n^4}{e} (t-s) \sum_{r=2}^{\infty} \frac{\sum_{l_1, \dots, l_r} a_{l_1, \dots, l_r}^{(n)}(s)}{\frac{l_1^4 l_2^4 \dots l_r^4}{l_1 l_2 \dots l_r}} w_{l_1}(s) \dots w_{l_r}(s) ds.$$

This is an infinite system of non-linear integral equations for the determination of $w_n(t)$, and we solve this by the method of successive approximations developed in our paper II. For this purpose we write,

$$(20) \quad w_n^{(0)}(t) = d_n e^{-n^4 t},$$

and for all $m > 1$

$$(21) \quad w_n^{(m)}(t) = d_n e^{-n^* t} + n^4 \int_0^t e^{-n^*(t-s)} \sum_{r=2}^{\infty} \sum_{l_r} a_{l_1^* \dots l_r^*}^{(n)} w_{l_1}^{(m-1)}(s) \dots w_{l_r}^{(m-1)}(s) ds,$$

where for convenience we have written $a_{l_r}^{(n)}$ for $a_{l_1, \dots, l_r}^{(n)}(t)$. Now we must show that the sequence $w_n^{(m)}(t)$ really tends to a limit as $m \rightarrow \infty$. To prove this, we remark first that for all $t > 0$ and all $n \geq 1$:

$$(22) \quad \left| \int_0^t e^{-n^*(t-s)} ds \right| = \left| e^{-n^* t} \int_0^t e^{n^* s} ds \right| = \frac{1}{n^4} \frac{e^{-1} - 1}{n^* t} \leq \frac{1}{n^4}$$

We have also from our Paper I, part I, § 2, that for all $l_1, l_2, \dots, l_r > 1$ and all $t \geq 0$:

$$(23) \quad \left| \frac{a_{l_1^* \dots l_r^*}^{(n)}}{l_1^* l_2^* \dots l_r^*} \right| \leq \frac{2 M (r+1)^2}{n^2}.$$

Therefore for all $l_1, l_2, \dots, l_r \leq 1$ we have

$$(24) \quad \left| \frac{a_{l_1^* \dots l_r^*}^{(n)}}{l_1^* l_2^* \dots l_r^*} \right| \leq \left| \frac{a_{l_1^* \dots l_r^*}^{(n)}}{l_1^* l_2^* \dots l_r^*} \right| \leq \frac{2 M (r+1)^2}{n^2}.$$

Thus from (21) we get on account of (22) and (24) for all t :

$$\begin{aligned} \sum_{n=1}^{\infty} |w_n^{(m)}(t)| &\leq \sum_{n=1}^{\infty} |d_n| + \sum_{n=1}^{\infty} n^4 \frac{1}{n^4} \frac{2 M}{n^2} \times \\ &\times \sum_{r=2}^{\infty} (r+1)^2 \left\{ \sum_{l_1, \dots, l_r}^{\infty} |w_{l_1}^{(m-1)}(s)| \dots |w_{l_r}^{(m-1)}(s)| \right\}. \end{aligned}$$

But since $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$ and $\sum_n |d_n| = c$, we get

$$(25) \quad \sum_{n=1}^{\infty} |w_n^{(m)}(t)| \leq c + \frac{M \pi^2}{3} \sum_{r=2}^{\infty} (r+1)^2 \left\{ \sum_{n=1}^{\infty} |w_n^{(m-1)}(t)| \right\}^r.$$

Now, for all t

$$(26) \quad \sum_n |w_n^{(0)}(t)| = \sum_n |d_n e^{-n^* t}| \leq \sum_n |d_n| = c.$$

Substituting this in (25) and taking $m = 1$, we get

$$(27) \quad \sum_{n=1}^{\infty} |w_n^{(1)}(t)| < c + \frac{M \pi^2}{3} \sum_{r=2}^{\infty} (r+1)^2 c^r.$$

But, it can be easily verified that $(r+1)^2 \leq 3^r$ for all $r \geq 2$, therefore, for $3c < 1$, we have

$$(28) \quad \sum_{n=1}^{\infty} |w_n^{(1)}(t)| < c + \frac{M\pi^2}{3} \sum_{r=2}^{\infty} (3c)^r = c + \frac{M\pi^2}{3} \frac{9c^2}{1-3c}.$$

We assume that

$$(29) \quad \frac{3M\pi^2 c^2}{1-3c} < c, \text{ i.e. } c < \frac{1}{3(1+\pi^2 M)},$$

then we have

$$(30) \quad \sum_{n=1}^{\infty} |w_n^{(1)}(t)| < 2c < 1.$$

We substitute this value again in (25) for $m=2$, and get on assuming $c < \frac{1}{6}$

$$(31) \quad \begin{aligned} \sum_{n=1}^{\infty} |w_n^{(2)}(t)| &< c + \frac{M\pi^2}{3} \sum_{r=2}^{\infty} (r+1)^2 (2c)^r \\ &< c + \frac{M\pi^2}{3} \sum_{r=2}^{\infty} (6c)^r = c + \frac{M\pi^2}{3} \frac{36c^2}{1-6c}. \end{aligned}$$

We assume further that

$$(32) \quad c < \frac{1}{12M\pi^2 + 6},$$

and get from (31)

$$(33) \quad \sum_{n=1}^{\infty} |w_n^{(2)}(t)| < 2c < 1.$$

Thus reasoning step by step, we see that for all $m \geq 1$

$$(34) \quad \sum_{n=1}^{\infty} |w_n^{(m)}(t)| < 2c < 1.$$

We shall prove further that the doubly infinite series

$$(35) \quad \sum_{m=0}^{\infty} \sum_{n=1}^{\infty} |w_n^{((m+1))}(t) - w_n^{(m)}(t)|$$

also converges uniformly for all t .

We have from (21):

$$(36) \quad \begin{aligned} w_n^{((m+1))}(t) - w_n^{(m)}(t) &= n^4 \int_0^t e^{-n^4(t-s)} \sum_{r=2}^{\infty} \sum_{l_1, \dots, l_r}^{(n)} \frac{a_{l_1, \dots, l_r}}{l_1^4 \dots l_r^4} \times \\ &\times \left\{ w_{l_1}^{(m)}(s) w_{l_2}^{(m)}(s) \dots w_{l_r}^{(m)}(s) - w_{l_1}^{(m-1)}(s) w_{l_2}^{(m-1)}(s) \dots w_{l_r}^{(m-1)}(s) \right\} ds, \\ &= n^4 \int_0^t e^{-n^4(t-s)} \sum_{r=2}^{\infty} \frac{1}{l_1 \dots l_r} \sum_{l_1, \dots, l_r}^{(n)} \frac{a_{l_1, \dots, l_r}}{l_1^4 \dots l_r^4} \left\{ w_{l_1}^{(m)} \dots w_{l_{r-1}}^{(m)} (w_{l_r}^{(m)} - w_{l_r}^{(m-1)}) \right\} \end{aligned}$$

$$\begin{aligned}
& + w_{l_r}^{(m-1)} w_{l_1}^{(m)} \dots w_{l_{r-2}}^{(m)} \left(w_{l_{r-1}}^{(m)} - w_{l_{r-1}}^{(m-1)} \right) \\
& + \left. w_{l_r}^{(m-1)} w_{l_{r-1}}^{(m-1)} \dots w_{l_2}^{(m-1)} \left(w_{l_1}^{(m)} - w_{l_1}^{(m-1)} \right) \right\} ds,
\end{aligned}$$

where all the w 's under the sign of integral are understood to be functions of s .

From (36) we get

$$\begin{aligned}
(37) \quad \sum_{n=1}^{\infty} |w_n^{(m+1)}(t) - w_n^{(m)}(t)| & \leq \frac{M\pi^2}{3} \sum_{r=2}^{\infty} r(r+1)^2 (2c)^{r-1} \times \\
& \times \sum_{n=1}^{\infty} |w_n^{(m)}(t) - w_n^{(m-1)}(t)|.
\end{aligned}$$

It can be easily proved that for all $r > 2$,

$$(38) \quad r(r+1)^2 \leq 18r-1,$$

therefore from (37) we get

$$(39) \quad \sum_{n=1}^{\infty} |w_n^{(m+1)}(t) - w_n^{(m)}(t)| < \frac{M\pi^2}{3} \sum_{r=2}^{\infty} (36c)^{r-1} \cdot \sum_{n=1}^{\infty} |w_n^{(m)}(t) - w_n^{(m-1)}(t)|.$$

We assume that $36c < 1$, i.e. $c < \frac{1}{36}$; therefore

$$(40) \quad \sum_{n=1}^{\infty} |w_n^{(m+1)}(t) - w_n^{(m)}(t)| < \frac{M\pi^2}{3} \frac{36c}{1-36c} \sum_{n=1}^{\infty} |w_n^{(m)}(t) - w_n^{(m-1)}(t)|.$$

Applying this inequality m -times we get:-

$$(41) \quad \sum_{n=1}^{\infty} |w_n^{(m+1)}(t) - w_n^{(m)}(t)| < \left(\frac{12M\pi^2c}{1-36c} \right)^m \cdot \sum_{n=1}^{\infty} |w_n^{(1)}(t) - w_n^{(0)}(t)|.$$

We assume finally that

$$(42) \quad \frac{12M\pi^2c}{1-36c} < 1, \text{ i.e. } c < \frac{1}{12M\pi^2 + 36},$$

then from (41) we have, on summing over m ,

$$(43) \quad \sum_{m=0}^{\infty} \sum_{n=1}^{\infty} |w_n^{(m+1)}(t) - w_n^{(m)}(t)| < \sum_{m=0}^{\infty} \left(\frac{12M\pi^2c}{1-36c} \right)^m \cdot \sum_{n=1}^{\infty} |w_n^{(1)}(t) - w_n^{(0)}(t)|.$$

But both $\sum_{m=0}^{\infty} \left(\frac{12M\pi^2c}{1-36c} \right)^m$ and $\sum_{n=1}^{\infty} |w_n^{(1)}(t) - w_n^{(0)}(t)|$

are easily seen to be convergent, and the latter series uniformly so, therefore we conclude that the double series (35) is uniformly convergent.

From this, it follows that all the limits

$$(44) \quad \lim_{m \rightarrow \infty} w_n^{(m)}(t) = w_n^{(t)} \quad (n = 1, 2, \dots)$$

exist, and that the functions $w_n(t)$ are continuous for all t . Moreover, we see that for all t :

$$(45) \quad \sum_n w_n(t) = \sum_n \left(\lim_{m \rightarrow \infty} w_n^{(m)}(t) \right) < 2c < 1.$$

From (21) we get then on making $m \rightarrow \infty$:

$$(46) \quad w_n(t) = d_n e^{n^4 t} + n^4 \int_0^t e^{n^4(t-s)} \sum_{r=2}^{\infty} \sum_{l_1, \dots, l_r}^1 \dots \sum_{l_1^s, \dots, l_r^s}^{\infty} \frac{a_{l_1, \dots, l_r}^{(n)}}{l_1^s \dots l_r^s} \times \\ \times w_{l_1}(s) w_{l_2}(s) \dots w_{l_r}(s) ds, \\ (n = 1, 2, 3, \dots).$$

We write again for all $n \geq 1$:

$$(47) \quad v_n(t) = \frac{1}{n^4} w_n(t), \quad c_n = \frac{d_n}{n^4}, \quad \text{then we get from (46) :}$$

$$(48) \quad v_n(t) = c_n e^{n^4 t} + \int_0^t e^{n^4(t-s)} \sum_{r=2}^{\infty} \sum_{l_1, \dots, l_r}^1 \dots \sum_{l_1^s, \dots, l_r^s}^{\infty} \frac{a_{l_1, \dots, l_r}^{(n)}}{l_1^s \dots l_r^s} \times \\ \times v_{l_1}(s) v_{l_2}(s) \dots v_{l_r}(s) ds.$$

We see therefore that $v_n(t)$ satisfies the integral equations (17) and therefore the differential equation (16). The series $\sum_{n=1}^{\infty} \sum_{r=2}^{\infty} \sum_{l_1, \dots, l_r}^1 \dots \sum_{l_1^s, \dots, l_r^s}^{\infty} |z_n(t)|$, $\sum_{n=1}^{\infty} n^4 |v_n(t)|$ and $\sum_n \left| \frac{dv_n}{dt} \right|$ are also readily seen to be uniformly convergent. Thus

$$(49) \quad u(r, t) = \sum_{n=1}^{\infty} v_n(t) \sin nx$$

is the required solution of the differential equation (1) which satisfies the given boundary conditions (3) and (4).

We have to prove now that this solution is unique, that is to say that (49) is the only solution which can be represented as a uniformly convergent series of the form $\sum_n v_n(t) \sin nx$, and which is such that the series $\sum_n n^4 |v_n(t)|$ and $\sum_n \left| \frac{dv_n}{dt} \right|$ also converge uniformly.

For this purpose it is sufficient to prove that the integral equations (19) have no other solution $\bar{w}_n(t)$ which is such that the series $\sum_n |\bar{w}_n(t)|$ is uniformly convergent.

If possible, suppose that $\bar{w}_n(t)$ is another such solution. Then we have

$$(50) \quad \bar{w}_n(t) - w_n(t) = n^4 \int_0^t e^{-n^4(t-s)} \sum_{r=2}^{\infty} \sum_{l_1, \dots, l_r}^1 \dots \sum_{l_1^s, \dots, l_r^s}^{\infty} \frac{a_{l_1, \dots, l_r}^{(n)}}{l_1^s \dots l_r^s} \times \\ \times \left\{ \bar{w}_{l_1} \dots \bar{w}_{l_r} - w_{l_1}^{(m-1)} w_{l_2}^{(m-1)} \dots w_{l_r}^{(m-1)} \right\} ds \\ = n^4 \int_0^t e^{-n^4(t-s)} \sum_{r=2}^{\infty} \sum_{l_1, \dots, l_r}^1 \dots \sum_{l_1^s, \dots, l_r^s}^{\infty} \frac{a_{l_1, \dots, l_r}^{(n)}}{l_1^s \dots l_r^s} \times \\ \times \left\{ w_{l_1} \dots w_{l_{r-1}} (\bar{w}_{l_r} - w_{l_r}^{(m-1)}) + \dots \right. \\ \left. + w_{l_r} w_{l_{r-1}} \dots w_{l_n}^{(m-1)} (\bar{w}_{l_1} - w_{l_1}^{(m-1)}) \right\} ds.$$

Now suppose that

$$(51) \quad \sum_n |\bar{w}_n(t) - w_n(t)| = c < 2c,$$

then we get from (50) on account of (22), (24) and (34):

$$(52) \quad \sum_n |\bar{w}_n(t) - w_n^{(m)}(t)| \leq \frac{M\pi^2}{3} \sum_{r=2}^{\infty} r(r+1)^2(2c)^r \cdot \sum_n |\bar{w}_n(t) - w_n^{(m-1)}(t)|, \\ < \frac{12M\pi^2c}{1-36c} \cdot \sum_n |\bar{w}_n(t) - w_n^{(m-1)}(t)|.$$

Repeating this inequality m -times we get:

$$(53) \quad \sum_n |\bar{w}_n(t) - w_n^{(m)}(t)| < \left(\frac{12M\pi^2c}{1-36c} \right)^m \sum_n |\bar{w}_n(t) - w_n^{(0)}(t)|.$$

But $\sum_n |\bar{w}_n(t) - w_n^{(0)}(t)|$ is easily seen to be uniformly convergent for all t ,

and from (42) $\frac{12M\pi^2c}{1-36c} < 1$, therefore

$$(54) \quad \lim_{m \rightarrow \infty} \sum_n |\bar{w}_n(t) - w_n^{(m)}(t)| = 0,$$

so that for all $t > 0$

$$\bar{w}_n(t) = \lim_{m \rightarrow \infty} w_n^{(m)}(t) = w_n(t) \quad (n = 1, 2, \dots)$$

The solutions $\bar{w}_n(t)$ and $w_n(t)$ are thus seen to be identical, which establishes the uniqueness of the solution (49).

Finally we remark that instead of taking the differential equation (1) to be of order 4, we can take it to be of any even order, and the method of this paper holds without any essential changes.

References—

- I. M. R. Siddiqi: 'Zur Theorie der nicht-linearen Partiellen Differentialgleichungen von parabolischen Typus.' Math. Zeitschrift, Vol. 35 (1932).
- II. M. R. Siddiqi: 'On an infinite system of non-linear integral equations.' Bulletin Calc. Math. Soc., Vol. 24 (1932).

THE PRAGMATIST ELEMENTS IN THE PHILOSOPHY OF BERGSON

By

MIR VALIUDDIN

I

The pragmatist tendency of Bergson's thought is evident from the fact that according to him the original purpose for which our intellect is intended is "to represent the relations of external things among themselves", to fulfil the utilitarian and practical purposes of life, to enable us "to secure the perfect fitting of our bodies to our environment. It is the "faculty of constructing unorganised, that is, artificial instruments"; it helps us "to distinguish in any circumstances whatsoever the means of getting out of a difficulty", and thus to preserve our lives. It is thus essentially a practical instrument directed upon matter for the sake of action and, if it deals with the real nature of things, it does so only symbolically, being inherently incapable of grasping it in its essence. This view of the nature and function of the intellect is, as we know, in *essential* agreement with the view taken by Schopenhauer who may be considered as the forerunner of the pragmatists in this particular respect. In what follows I shall examine this view more closely and try to bring out clearly the affinities of Bergson's conception with that of Schopenhauer and the pragmatists.

Bergson considers *intellect* from the point of view of evolution and points out that it is "an appendage of the faculty of action" prompted by interest for practical utility. Its destination is thus entirely practical. Its business is to enable the organism to act successfully upon its environment. "Its function is to preside over action." An empirical study of evolution shows that since the appearance of man on the face of the earth the essential feature of human intelligence has been mechanical construction. From this point of view man might more fittingly be called *Home Faber* than *Home sapiens*. Thus considered in what seems to be its original feature, *intellect*, says Bergson, is "the faculty of manufacturing artificial objects, especially tools, and of indefinitely varying the manufacture."¹ If Nature has not endowed man with "organic instruments" to serve the purposes of his life, it is because it has fitted him with intelligence which enables him to vary the construction of the instruments according to the needs and circumstances of life. Unintelligent animals also possess tools or machines but here the instruments form a part of the body; they are 'organic instruments' and are invariable structures whose objects are also specific. But the needs of man are multifarious and their objects are also changing and variable. Therefore Nature has provided man with intelligence the main purpose of which is to help him to adapt himself to his environments in his struggle for existence. "The essential function of the intellect" says Bergson like Schopenhauer and the pragmatists, "is, therefore, to see the way out of a difficulty in any circumstances whatever, to find what is most suitable, what answers best to the question asked. Hence it bears essentially on the relations between a given situation and the means of utilising it."² And Bergson proceeds to point out that "what is innate in intellect, therefore, is the tendency to *establish relations*." Knowledge necessarily bears on relations. Thus the knowledge which is characteristic

¹ *Creative Evolution* (Eng. Trans. by A. Mitchael 1911), p. 146.

² *Ibid.*, p. 158.

of our intelligence is that of practical utility and "it is in view of practical utility that it has made its appearance in the world."¹ Hence intelligence is thus regarded as relative to the needs of action. And starting from action Bergson lays down that the intellect aims first of all at constructing and this construction or fabrication is exercised exclusively on inert matter, and of inert matter itself fabrication deals only with the solid.² "Our intelligence as it leaves the hand of Nature has for its chief object the unorganised solid."²

But it is natural to ask why does the intellect move about freely in solids? What is the general property of the material world which makes it appear to Bergson practically fit for the operation of the intellect? It is due to the *homogeneity* of the material world that the intellect acts so easily upon it. The intellect following the suggestions of the needs and wants of our practical life cuts up arbitrary parts in the continuity of the extended world and regards those parts as provisionally final.³ This procedure facilitates the pragmatic purpose for which the intellect has come into existence. It is because of the homogeneity of space that arbitrary divisibility (or "the possibility of decomposing the matter as much as we please") is realised and this helps the intellect to fulfil its natural function; it 'affords a hold to our action'.⁴

But as we shall see presently, it is more on account of his conception that matter and intellect are of the *same* nature that Bergson is able to explain the adaptability of intellect to matter; for he maintains that "an identical process must have cut out matter and intellect at the same time from a stuff that contained both."⁵ Thus intellect is a product, a "deposit" of the evolutionary process, "a flame perhaps accidental", "an emanation" or an "aspect" of life; for it is "a more precise, complex and subtle adaptation of the consciousness of living beings to the conditions of existence that are made for them."⁶ And hence "intellect and matter have progressively adapted themselves one to the other in order to attain a common form."⁷ The purpose of the adaptation is, as we said above, "to secure the perfect fitting of our body to its environment," "to represent the relation of external things among themselves", i.e. to "think matter." This explains why the intellect is "at home among inanimate objects, more especially among solids," and "traces the general configuration of matter."⁸

The pragmatic nature of the intellect is shown in still another different way. Intellect in its natural state, says Bergson "aims at a practically useful end."⁹ Now from the practical point of view, the important thing in an object on which we are acting is not the progress by which it passes from one position to another, but its *actual* or future *positions*, its end. Our attention is mainly directed on the plan of execution. This serves our practical purpose. Our intellect gains nothing by dealing with the mobility itself, therefore it always starts with immobility. This is what it requires for its useful action. Its proper goal or natural destiny is action, and not speculation. It is meant for practical purposes only and, hence by virtue of its natural disposition, it is concerned with the stable and the unchangeable. Hence it forms a clear idea of what is immobile alone in the same manner as it forms a clear idea of the discontinuous.¹⁰

To sum up the pragmatist elements in the philosophy of Bergson, we might say that his anti-intellectualism rests ultimately upon his contention that the human intellect is designed for the sake of action and therefore it is related in the main to the needs of action; that our intellect finds itself at home in the domain of the physical and the mathematical sciences, and its skill is displayed in the mechanical construction

¹ *Creative Evolution*, p. 159.

² *Ibid.* p. 161 ff.

³ *Matter and Memory* (Eng. Trans.), p. 278.

⁴ *Creative Evolution*, p. 162.

⁵ *Ibid.* p. 199.

⁶ *Ibid.* Intro., pp. ix, xiii.

⁷ *Ibid.* p. 217.

⁸ *Ibid.* Intro., xiv.

⁹ *Ibid.* p. 163.

¹⁰ *Ibid.* p. 164.

of tools and instruments, in manufacturing artificial objects which minister to the practical and utilitarian purposes of human life. It has been evolved for the maintenance and furtherance of our lives, to utilise the means that promote our practical welfare, to show us the way out of difficult circumstances, in a word, to be of every practical use to us. And it is only for the purpose of practical action that it materialises the world covering it with three-dimensional homogeneous space, rendering arbitrary divisibility possible in order to deal with reality instrumentally. It is for the same purpose that the intellect 'spatializes' time, conceiving it as something homogeneous and then splitting it up into discontinuous units and thus manipulating reality for its own practical needs. Thus each and every function of the intellect shows that by its nature it is a thoroughly practical tendency fashioned as a tool for the pragmatic purpose of life.

II

There is one more important point in Bergson's anti-intellectualism which is distinctive of him and is to be found neither in Schopenhauer nor in the pragmatists, but nevertheless supports the general doctrine as regards the practical nature of consciousness. This is the striking truth that Bergson emphasises in his *Matiere et Memoire* that the brain is an organ of action rather than an organ of thought and that the "body is an instrument of action" only. Bergson endeavours to establish this truth by a consideration of the nervous system from one end of the animal series to the other. The structure of the nervous system, as even a superficial examination of this will disclose, is designed for action and action alone. He points out that the difference between what is called the perceptive faculty of the brain and the reflex functions of the spinal cord, is only a difference of degree, and not of kind. There is only a difference of more or less complications. In the case of a reflex action, what happens is that the centripetal movement which is excited by the external stimulus is "reflected at once by the intermediary of the nerve centres of the spinal cord, in a centrifugal movement determining a muscular contraction".¹ The function of the cerebral system is a little more complicated than this. The movement communicated by the stimulus instead of directly proceeding to the motor cells of the spinal cord and thus causing a contraction "mounts first to the brain and then descends again to the very same motor cells of the spinal cord which intervened in the reflex action." Here the stimulus has choice of one or more systems of centrifugal movements. The brain is thus no more than a kind of "central telephonic exchange" whose office is to allow communication or to delay it but it adds nothing to what is received. It is only an "instrument of analysis in regard to the movement received and an instrument of selection in regard to the movement executed."² Thus in both cases its office is only the transmission and division of movement; neither in the cortical nor in the spinal cord do the nervous elements work with a view to knowledge.³

Thus our bodily structure and nervous organisations are directed towards action alone; our nervous system is an instrument of movements, and in it there is no apparatus to prepare representations. As the structure of the nervous system develops, becomes more and more complicated, the choice between different movements becomes wider and wider and thus an ever-increasing variety of conduct becomes possible. But if it is constructed from one end of the animal series to the other in view of action which becomes less and less necessary or automatic, must not perception which progresses with the nervous structure be also entirely directed towards action and not towards pure knowledge?⁴ If we take this view of perception it becomes clear why idealism and realism fall into a sterile discussion. Both of these doctrines are based on

¹ *Matter and Memory* (Eng. Tr.), p. 18.

² *Ibid.*, p. 20.

³ *Ibid.*, p. 20.

⁴ *Ibid.*, p. 21.

the common postulate that "perception has an entirely speculative interest, it is pure knowledge." But as has been shown, this postulate—according to which "to perceive" is "to know"—is contradicted by the study of the nervous structure in the entire animal series. The office of perception is not to supply us with knowledge but the conditions that are necessary for action. Perception is thoroughly practical and utilitarian in character and has reference to bodily action alone. Perception is nothing but selection from reality. We select those objects which have a practical interest for us and discard those that have no interest for our needs or, more generally, for our functions and perception results "just from the omission of that in the totality of matter which has no interests for our needs"; and the means of this selection is our body which is organised to exclude those influences that have no practical concern.¹

The practical and utilitarian aspect of perception is an important teaching of Bergson and is much emphasised by him. "What I see and hear of the outer world" he writes in *Laughter* (p. 151.) "is purely and simply a *selection made by my senses to serve as a light to my conduct*; what I know of myself is what comes to the surface, what participates in my actions. My senses and my consciousness, therefore, give me no more than a practical simplification of reality in the vision they furnish me of myself and of things, the differences that are useless to man are obliterated, the resemblances that are useful to him are emphasised, ways are traced out for me in advance along which my activity is to travel. These ways are the ways which all mankind has trod before me. Things have been classified with a view to the use I can derive from them." This agrees with Schopenhauer's contention that those things only are known which have some interest to the individual, that is, are related to the will to live.² We perceive in Nature what interests us in the way of our vital needs. It further follows that all those concepts which are detached from the needs of life and serve no practical purpose are of little value or significance. Schopenhauer also protests against this "systematic misuse of concepts", and the pragmatic reference of a concept to its perceptual terminus in order to prove its validity, seems to be simply another proof of its vital connection with the perceptual order. Bergson holds that all the fundamental concepts of science and common sense have only a relative and practical character and are meant for particular use; they do not serve any general or final purpose. They minister to the utilitarian and practical needs of life. Thus, the whole knowledge of the world is necessarily a knowledge in terms of our practical purposes. Our whole mental life is again purposive and what we think about and what we believe is determined more largely than we realise by our interests and desires. The world of our experience is coloured by our practical aims. Our perception, as we noted above, reveals to us only those aspects of the world which are in some way related to our practical needs and interests. Thus Bergson by emphasising the fact that perception consists in the omission of that which has no interest for the vital needs of our life, has brought out forcibly a very valuable truth which, as we know, is the soul of pragmatism.

III.

In all this the pragmatist tendencies of Bergson's thoughts are manifestly clear. But, like Schopenhauer Bergson seems to transcend pragmatism when he points out that the supreme mistake of the philosopher lies in importing to the realm of philosophy a method of thinking that was originally designed for the sake of action. The function of the intellect is "to *act* and to know that we are acting"³, it is not its function to *speculate*. It is the intrusion of the practical intellect in the sphere of

¹ Cf. *Matter and Memory*, pp. 28-29; "They (living beings) allow to pass through them, so to speak, those external influences which are indifferent to them, the others isolated, become 'perceptions' by their very isolation."

² Cf. Haldane and Kemp, Vol. 1, p. 229.

³ *Creative Evolution*, pp. 201-202.

speculation, he insists, that is responsible for many of the "difficulties hitherto inherent in all metaphysics, the antinomies which it raises, the contradictions into which it falls, the division into antagonistic schools and the irreducible oppositions between systems". Following his instrumentalist epistemology Bergson like Schopenhauer (and the pragmatists, of course) declares that the intellect gives us truths only 'relative to our faculty of action',¹ but with Schopenhauer, again, leaves pragmatism behind, and once more like him (Schopenhauer) is determined by his own metaphysical conclusion when he asserts that one can grasp the reality absolutely (instead of knowing it relatively) if one turns *away from the intellect and towards intuition* which dispenses with symbols and seizes (directly and immediately) the reality in its purity and perfection. In proportion as we compel ourselves to "transcend pure intelligence", Bergson emphasises, we shall get back more and more completely to the reality which is the essence of all phenomenal existence.² Thus Bergson (like Schopenhauer) would free philosophy from "the last traces and symptoms of scientific rationalism" by ascribing to it a function according to which "we must break with scientific habits which are adapted to the fundamental requirements of thought, we must do violence to the mind, go counter to the natural bent of the intellect."

In effect, then, Bergson's anti-intellectualism, like that of Schopenhauer, is mainly determined by his metaphysical position. But to understand Bergson's metaphysical position and to differentiate it from that of Schopenhauer we have to recall the result of our previous discussion. Bergson maintains as hinted above, that the genesis of intellect and the genesis of matter are correlative inasmuch as "both are derived from a wider and a higher form of existence."³ This higher form of existence or the absolute (which Bergson calls 'Duration' or "elan vital" and which is "revealed very near us and in a certain measure in us" by means of "intuition") is a "flow", a "tendency", not a being; it is becoming and is "the very life of things, the fundamental Reality." Bergson holds further that this reality whose evolution presents "a ceaseless upspringing of something new" is "momentarily interrupted",⁴ or "arrested" or "distends" (no one knows why, and M. Bergson does not tell us why) and as such is the principle of matter and extension. Matter is thus nothing but the relaxation or diminution or detention⁵ of the life-current. The interruption or relaxing of the life-current causes it to congeal and the congealed parts are matter. And just as matter and mind are of the same nature, so also as we have seen above, matter and intellect are in their turn of the same nature. The life-current turning its attention "on the matter it was passing through" turned in the direction of intellect just as it turned in that of 'instinct' or 'intuition' when it fixed its attention on its own movements. It had, thus, to go in "two opposite ways."⁶ And so we are told that "intellectuality and materiality are of the same nature and have been produced in the same way" inasmuch as the life-current cannot pass through matter without settling on it without adapting itself to it, and this adaptability is what we call intellectuality.⁷

And now we can see more clearly why matter is determined by intelligence and why there is between them an evident agreement; why the moulds of intellect are fashioned on matter, why "its chief object is the unorganised solid"; "it is never at home except when working on inert matter. It is extended; it presents to us objects external to other objects, and in these objects, parts external to parts." "Its habits and views are static." Constructed from the very beginning as an instrument of action on matter, it acts and knows that we are acting and is guided and ruled by the

¹ *Creative Evolution*, p. 206.

² *Ibid.*, p. 210.

³ *Ibid.*, p. 187.

⁴ *Ibid.*, p. 253; also p. 222.

⁵ *Ibid.* pp. 222, 250 ff.

⁶ *Ibid.*, p. 281.

⁷ *Ibid.*, p. 285.

special "work that is being accomplished." This, then, accounts also for the incapability of the intellect to grasp reality, i.e. Duration, for "reality appears as a ceaseless upspringing of something new which has no sooner arisen to make the present than it has already fallen back into the past." Our intellect being accustomed to think the moving by means of the immovable is thus incapacitated to grasp true duration which is the "very substance of things." "It has no direct vision of reality." Its proper object is that which is singled out of reality for *practical interest*. Thus what the intellect grasps of the real is *static, relative, mechanical, symbolical*. And this Bergson points out is the "natural metaphysic of the human mind" against which, however, we should be strictly on our guard. Otherwise we shall be committing the fallacy of the intellectualist philosopher, that is, of importing into speculation a procedure made for practice.

The genuine anti-intellectualism of Bergson is then the result of this metaphysics of life and duration, as the anti-intellectualism of Schopenhauer was that of the metaphysics of the Will. This materialising or spatialising by the intellect of what is in its very nature opposed to all spatial categories, distinguishes Bergson's treatment of the intellect from that of Schopenhauer. But the result of the investigation in both cases seems to establish the same thesis. The intellect is condemned by both and is shown to be merely a practical tool which, for the interest of action, *falsifies reality*. But in both cases as it is clear, the doctrine of the essentially instrumental office of the intellect *alone* need not have any radical anti-intellectualistic consequences for on the mere ground of instrumentalist epistemology one cannot maintain that besides the knowledge which our intellect affords, the reality is known, in a quite different way, to have a definite quality other than what our intellect reveals. But this latter, as has been amply proved, is exactly the procedure adopted by Schopenhauer and Bergson alike.

IV

From Bergson's treatment of the nature of the intellect and its operations we are enabled to understand the nature of the concept. "Concepts are, in fact, outside each other, like objects in space and they have the same stability as such objects on which they have been modelled. Taken together, they constitute an 'intelligible world' that resembles the world of solids in its essential characters but whose elements are lighter, more diaphanous, easier for the intellect to deal with than the images of concrete things; they are not, indeed, the perception itself of things, but the representation of the act by which the intellect is fixed on them.¹ The concepts are, thus, mere symbols derived from the consideration of solid bodies and express the relations that exist between them; they remain distinct and external like the solids on which they are modelled.² They are formed into a system but the system itself like its component parts is stereotyped and fixed. The intellect is thus shown to carry a 'latent mechanism of geometry' within itself which shapes itself into logic, and that "logic and geometry engender each other."³ It is, therefore, why "our logic triumphs in . . . geometry."³ Conceptual knowledge, thus, can at best be only external and symbolical. It reduces the non-spatial creative reality to "a geometrical diagram."

Bergson thus repeatedly tells us that concepts (ideas abstractes) can never give us the reality of things which on account of its 'uniqueness' always escapes from the grip of all conceptual analysis. To illustrate conceptual knowledge Bergson compares it to the mechanism of the cinematograph.⁴ Just as there is no movement in the snapshot views on the screen *themselves* but only in *the machine* which gives us not real movement itself but an *imitation* by making the snapshots replace each other very rapidly, so also the "mechanism of our thought" works in the same manner and

¹ *Creative Evolution*, p. 189.

² *Ibid.*, p. 169.

³ *Ibid.*

⁴ *Ibid.*, pp. 322-33.

instead of penetrating into the inner being of things, places us outside and thus gives us an artificial and phenomenal knowledge. We take snapshots, as it were, of the reality. Thus, adds Bergson, "perception, intellection, language, so proceed in general."¹

The limitations of this method of symbolism which gives us only an "artificial reconstruction of the object" are insisted upon by Bergson in several different passages in all his writings. By juxtaposing artificial static concepts it is useless to believe that "we can seize a reality of which they present to us the shadow alone."² Besides producing this sort of illusion they are liable to a great danger. They are misleading for they generalise at the same time as they abstract.² It is by making the particular property of an object common to an infinite number of other objects that the concept can symbolise it and in this way it deforms the property by the vast extension that it gives to it,³ so that it no longer coincides with the object. It is this "artificiality," this "generality" and rigidity" of the concepts that makes them incapable of replacing "intuition" which comprehends by a simple act the very life and reality of the object, that which is "essential and unique in it."

This criticism of conceptual knowledge in general is applied to science in particular, for "positive science is the work of pure intellect."⁴ Bergson agrees in effect with Schopenhauer that all positive sciences working with conceptual analysis and synthesis can give us only a symbolical and relative knowledge. "All analysis," Bergson points out, "is a translation, a development into symbols, a representation taken from successive points of view from which we note as many resemblances as possible between the new object which we are studying and others which we believe we know already."⁵ Thus in order to complete its representation analysis multiplies its points of view indefinitely but then it can never give us a perfect representation of the real. Being merely a translation of the reality into conceptual symbols, it always remains imperfect and incomplete. Bergson makes this point clear by the use of various striking examples which all bring out forcibly the "unoriginality," the "relativity," the "superficiality" and "the artificial construction" of scientific or conceptual analysis and furnish him with a strong proof of its character as practical and instrumental, a mere convenient aid to action but without metaphysical significance, the object of metaphysics being to grasp the reality, not its representation, the original, not its translation.

It was also in reference to conceptual or scientific knowledge (which was to him nothing more than an indirect knowledge useful for the sake of action) that Schopenhauer had said; "Wir sehen schon hier, dass von aussen dem Wesen der Dinge nimmermehr beizukommen ist; wie immer man auch forschen mag, so gewinnt man nichts, als Bilder und Namen. Man gleicht einem, der um ein Schloss herumgeht, vergeblich einen Eingang suchend und einstweilen die Fassaden skissierend. Und doch ist dies der Weg den alle Philosophen vor mir gegangen sind."⁶ The way from without ("von aussen") is the way of conceptual knowledge which, as Schopenhauer points out, has been followed by all the philosophers before him. Schopenhauer, as we have seen, attributes the failure to attain the end that each philosopher set out with the intention of reaching to the method which they all adopted. For the intellectual apprehension which is the method of science he substitutes intuitive method. It is remarkable that Bergson in pointing out the artificiality and symbolical externality of concepts (which are to him nothing but "cadre intellectual" or "rubrique") expresses himself in the very same manner. The simile which he makes use of in expressing the idea that it is a vain attempt to try to arrive at the reality and life of things with the help of concepts is, indeed, very similar. Thus he writes; "It is like what an artist passing through Paris

¹ *Creative Evolution*, p. 323.

² *Intro. to Metaphysics* (Eng. Trans.), p. 16.

³ *Ibid.*

⁴ *Creative Evolution*, p. 206.

⁵ *Intro. to Metaphysics*, pp. 6-7.

⁶ *G.* i. 150.

Haldane and Kemp, i. 128.

does when he makes, for example, a sketch of a tower of Notre Dame . . . For the real and internal organisation of the thing he substitutes, then, an external and schematic representation." ¹ Compare further the resemblance in expression; when applied to reality the intellect "goes all round it, taking from the outside the greatest possible number of views of it, drawing it into itself, instead of entering into it." ² The point is the same, that is to say the intellectual attempt to reconstitute the objects by external means, by the juxtaposition of rigid and superficial concepts, does not enable us to grasp the inner life and essence of the things. Concepts cannot grasp what is unique and absolute in the object but divide its "concrete unity into so many symbolical expressions." What constitutes the reality of things "cannot be perceived from without" ³ nor "can it be expressed by symbols being incommensurable with everything else." ³ In this way, then, Bergson like Schopenhauer, maintains that if philosophy is to be saved from degenerating into a "play of ideas", "it must transcend concepts in order to reach intuition;" ⁴ it must do away with rigid and "ready-made" abstractions or concepts; it must go beyond them to feel the heart of things and the pulse of life by a way or method of its own which is strictly *not* scientific or conceptual but instinctive or intuitional. It is concepts that divide philosophy into distinct schools each of which "carries on with other a game that will never end." ⁵ A complete and radical change in the method of philosophy is thus suggested by Bergson in the same way as it was urged by Schopenhauer himself.

¹ *Intro. to Metaphysics*, pp. 22, 23.

² *Creative Evolution*, p. 186.

³ *Intro. to Metaphysics*, p. 4.

⁴ *Ibid.*, p. 18.

⁵ *Idem.*

PERCARBONATES

By

RANGNATH RAO KAMTIKAR AND SYED HUSAIN

Potassium and rubidium percarbonates were prepared by Constam and Hansen¹ by electrolysing concentrated solutions of carbonates at low temperatures.



where M represents an alkali metal.

Tanatar² found that when sodium carbonate is dissolved in cold, 3 per cent hydrogen peroxide and the solution precipitated with alcohol a white precipitate is obtained, which has a formula Na_2CO_4 , $1\frac{1}{2} \text{H}_2\text{O}$. But this was later proved to be Na_2CO_3 , H_2O_2 , $\frac{1}{2} \text{H}_2\text{O}$. Wolfenstein and Peltner³ obtained a new series of percarbonates by the action of carbon dioxide on sodium peroxide or on sodium hydro-peroxide. To these new compounds they assigned the formulæ Na_2CO_4 , $\text{Na}_2\text{C}_2\text{O}_6$, and $\text{Na}_2\text{C}_2\text{O}_6, \text{H}_2\text{O}_2$. The compound $\text{K}_2\text{C}_2\text{O}_6$ prepared by electrolysis has the same formula as $\text{Na}_2\text{C}_2\text{O}_6$ of Wolfenstein and Peltner and yet they act differently towards a neutral solution of potassium iodide, i.e. electrolytically prepared $\text{K}_2\text{C}_2\text{O}_6$ liberates iodine quantitatively⁴ whereas Wolfenstein and Peltner's $\text{Na}_2\text{C}_2\text{O}_6$ liberates 50 per cent. of iodine only.⁵ When Tanatar's salt is added to a neutral solution of potassium iodide practically there is no liberation of iodine.⁶

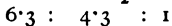
Some hold that the compounds prepared electrolytically are true percompounds and those prepared by the action of hydrogen peroxide are additive compounds. Hence the present work was undertaken with a view to find out the nature of the salts of Wolfenstein and Peltner and that of Tanatar.

Experimental

Great care was taken to ensure the purity of the materials used. They were all obtained pure from Merck or Kahlbaum.

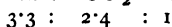
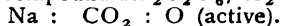
Altogether 4 compounds were prepared carefully according to the methods given by their authors, and analysed. The active oxygen was determined by titrating with potassium permanganate solution,⁷ and sodium and carbon dioxide by titrations with hydrochloric acid, using phenolphthalein and methyl orange respectively as indicators.

1. The compound $\text{Na}_2\text{C}_2\text{O}_6$ was found to have the composition



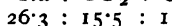
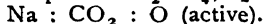
So that its formula would be $\text{Na}_6\text{C}_4\text{O}_{13}$ or in a simple form $2\text{Na}_2\text{CO}_3 + 2\text{NaHCO}_3$ with some alcohol of crystallisation and a little active oxygen.

2. The compound $\text{Na}_2\text{C}_2\text{O}_6, \text{H}_2\text{O}_2$ has the composition



So that its formula would be $\text{Na}_3\text{C}_2\text{O}_7$ or in a simple form $\text{Na}_2\text{CO}_3 + \text{NaHCO}_3 + \text{H}_2\text{O}_2$. This compound liberates very little iodine when treated with a neutral solution of potassium iodide.

3. The compound $\text{Na}_2\text{CO}_4, 1\frac{1}{2} \text{H}_2\text{O}$ possesses the composition



So that its formula would be $\text{Na}_{26.3}\text{C}_{15.5}\text{O}_{45}$ or in a simple form $4\text{Na}_2\text{CO}_3 + \text{NaHCO}_3$.

4. Tanatar's compound has the composition

Na : CO₂ : O (active).

2.71 ; 1.21 : 1 Therefore its formula would be Na₂CO₄, 1½ H₂O.

As the compound practically liberates no iodine from a neutral solution of potassium iodide, it is not a true percarbonate but an additive compound of hydrogen peroxide and sodium carbonate with half a molecule of water of crystallisation

(Na₂CO₃, H₂O₂, ½ H₂O).

Properties of the Compounds.—These compounds are white in colour, possessing alcohol of crystallisation. They are stable, but lose oxygen slowly and are completely decomposed in a few months. They liberate hydrogen peroxide when heated cautiously. Ether extracts hydrogen peroxide from these compounds and the ethereal solution gives characteristic reactions of hydrogen peroxide. The compounds do not liberate any appreciable amount of iodine from a neutral solution of potassium iodide even in 24 hours.

Conclusions

The experiments of Wolfenstein and Peltner were repeated. It was found that the two compounds Na₂C₂O₆ and Na₂CO₄, 1½ H₂O are mixtures of sodium carbonate and bicarbonate in various proportions with a slight amount of active oxygen probably due to the presence of traces of sodium peroxide or sodium hydroperoxides; the third compound Na₂C₂O₆, H₂O₂ appears to be Na₂CO₃ + NaHCO₃ + H₂O₂, xC₂H₅OH. They have alcohol as alcohol of crystallisation in their composition. The formula of the Tanatar's compound Na₂CO₃, H₂O₂, ½ H₂O is confirmed by the present investigation.

References

1. Constam and Hansen, Z. Elektrochem., 1896-7, **3**, 137.
2. Tanatar, Ber., 1899, **22**, 1544.
3. Wolfenstein and Peltner., Ber., 1908, **41**, 280.
4. Riesenfeld and Reinhold, Ber., 1909, **42**, 4377.
5. Riesenfeld and Mau, Ber., 1911, **44**, 3495.
6. Riesenfeld and Mau, Ber., 1911, **44**, 3589;
Riesenfeld, Ber., 1910, **43**, 566.
7. Hansen, Z. Elektrochem., 1896-7, **3**, 455;
Brown, J. Amer. Chem. Soc., 1905, **27**, 1222.

